Service Manual

WT1010, WT1030/WT1030M
Digital Power Meter

SM 253610-01E

YOKOGAWA ◆
Yokogawa Electric Corporation

WT1010, WT1030/WT1030M
Digital Power Meter

SM 253610-0

SM 253610
1st Edition

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IMPORTANT NOTICE TO THE USER

This manual contains information for servicing the YOKOGAWA 2536 Digital Power Meter. Confirm by model code that this document covers the instrument to be serviced. **Do not use the wrong manual**.

Before any maintenance and servicing, **read all safety precautions carefully**.

Only properly trained personnel may carry out maintenance and servicing in accordance with and to the extent permitted by this Service Manual.

Do not disassemble the instrument or its parts, unless otherwise clearly permitted by this Service Manual.

Do not replace any part or assembly, unless otherwise clearly permitted by this Service Manual.

YOKOGAWA ELECTRIC CORPORATION (YOKOGAWA) does not in principle supply parts other than those listed in the Customer Maintenance Parts List in this Service Manual (mainly modules and assemblies). Therefore if an assembly fails, the user should replace the whole assembly and NOT components within the assembly (see NOTE). If the user attempts to repair the instrument by replacing individual components within the assembly, YOKOGAWA assumes no responsibility for any consequences, such as defects in instrument accuracy, functionality, or reliability, or user safety hazards.

YOKOGAWA does not offer more detailed maintenance and service information than that contained in this Service Manual.

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NOTE

YOKOGAWA instruments have been designed in a way that the replacement of electronic parts can be done on an assembly (module) basis by the user. YOKOGAWA instruments have also been designed in a way that trouble-shooting and replacement of any faulty assembly can be done easily and quickly. Therefore, YOKOGAWA strongly recommends replacing the entire assembly over replacing parts or components within the assembly. The reasons are as follows:

- The instruments use high-performance micro-processors, large scale CMOS gate arrays and surface-mount components to provide state-of-art performance and functions.
- Repair of components can only be performed by specially trained and qualified maintenance personnel with special tools. In addition, repair of components requires various special parts and components, including costly ones. It also requires facilities where highly accurate and expensive maintenance equipment and special tools are provided.
- When taking the service life and cost of the instruments into consideration, the replacement of assemblies offers the user the possibility to use YOKOGAWA instruments more effectively and economically with a minimum in down-time.

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INTRODUCTION

This manual contains information for servicing the YOKOGAWA Digital Power Meters WT1010,WT1030/WT1030M.
The corresponding model codes are 253610, 253620, 253630 and 253640.

This manual is the first edition, March 1997.

WARNING

This Service Manual is to be used by properly trained personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to the Safety Precautions prior to performing any service.
Even in case of servicing according to this Service Manual and carried out by qualified personnel, YOKOGAWA assumes no responsibility for any result occurring from this servicing.

CERTIFICATION

YOKOGAWA certifies that this instrument underwent stringent inspections and performance tests before it was shipped from the factory, and was found to have met the specifications described in this document.

YOKOGAWA also certifies that the calibration standards are traceable to the Electrotechnical Laboratory of the Ministry of International Trade and Industry (which maintains Japan's primary electrical standards) to the extent allowed by the organization's calibration facilities. Calibration standards not traceable to that organization are traceable to the calibration facilities of other members of the International Electrotechnical Commission (IEC), or of members of the International Organization for Standardization (ISO).

SAFETY PRECAUTIONS

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS given elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument.
YOKOGAWA ELECTRIC CORPORATION assumes no liability for the customer's failure to comply with these requirements.

General definitions of safety symbols used on equipment and in manuals

Explanation: To avoid injury, death of personnel or damage to the instrument, the operator must refer to an explanation in the instruction manual.

Protective grounding terminal: To protect against electrical shock in case of a fault. This symbol indicates that the terminal must be connected to ground before operation of equipment.

WARNING

A **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death of personnel.

CAUTION

A **CAUTION** sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part of the product.

WARNING

Power Supply
Ensure the source voltage matches the voltage of the power supply before turning ON the power.

Protective Grounding
Make sure to connect the protective grounding to prevent an electric shock before turning ON the power.

Necessity of Protective Grounding
Never cut off the internal or external protective grounding wire or disconnect the wiring of protective grounding terminal. Doing so poses a potential shock hazard.

Fuse
To prevent a fire, make sure to use the fuse with specified standard (current, voltage, and type). Before replacing the fuse, turn off the power and disconnect the power source. Do not use a different fuse or short-circuit the fuse holder.

Do not Operate in an Explosive Atmosphere
Do not operate the instrument in the presence of flammable liquids or vapors. Operation of any electrical instrument in such an environment constitutes a safety hazard.

External Connection
To ground securely, connect the protective grounding before connecting to measurement or control unit.

HOW TO USE THIS MANUAL

This manual is meant to be used by qualified personnel only. Make sure to have read the safety precautions at the beginning of this manual and the warnings/cautions contained in the referred chapter prior to carrying out any servicing.

This manual contains the following chapters:

1 PRINCIPLE OF OPERATION
Describes the principle and configuration of the 253610, 253620, 253630 and 253640 Digital Power Meters.

2 TESTING
Describes the method and interpretation of the acceptance, self diagnosis and performance tests.

3 REPLACING PARTS
Describes basic information concerning replaceable parts.

4 ADJUSTMENTS
Describes the way to calibrate and adjust the instrument after the testing results are out of specifications.

5 TROUBLE-SHOOTING
Describes procedures for trouble-shooting.

6 ENGINEERING DRAWINGS
Contains the schematic diagrams, location of components, and list of electrical parts.

7 CUSTOMER MAINTENANCE PARTS LIST (CMPL)
Contains exploded views and a list of replaceable parts.

Appendix List of Manufacturers of Electoronic Parts

Specifications are not included in this manual; for specifications, refer to chapter 16 of IM253610-01E (WT1010), and refer to chapter 16 of IM253620-01E (WT1030/WT1030M).

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Chapter 1 PRINCIPLE OF OPERATION

This chapter describes the principle of operation for the WT1010, WT1030/WT1030M Digital Power Meter.

This chapter consists of the following sections.

1.1 Overview of the Model
1.2 Circuit Configuration and Function
1.3 Measurement and Computation Operation

1.1 Overview of the Model

The description below corresponds to the Figure 1.1 Block Diagram.
Also, refer to the chapter 6 ENGINNERING DRAWINGS too.

The WT1010, WT1030/WT1030M is a Digital Power Meter that uses digital-sampling technology. It consists principally of the input, DSP, CPU, and display components. The WT1010, WT1030/WT1030M measures values of voltage and current by using a sampling A/D converter to instantaneously convert the analog voltage and current signals into digital signals. The power measurement value is calculated in the DSP by multiplying together the instantaneous digital voltage and current values and performing averaging on the result.

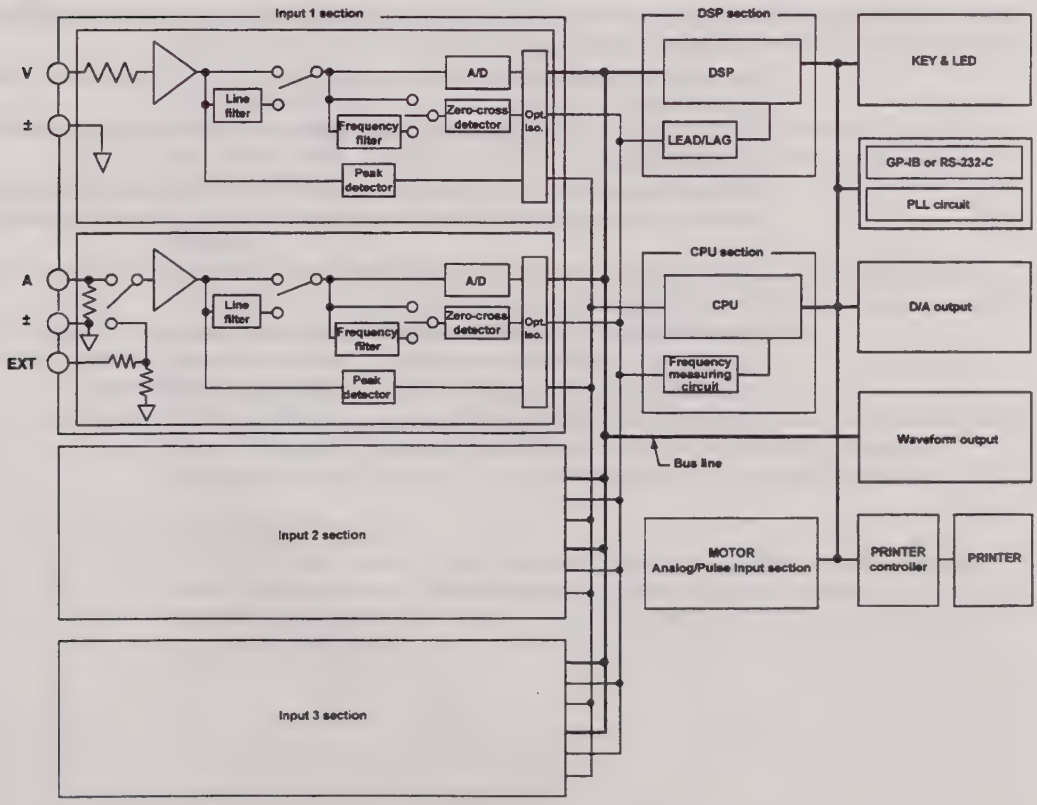


Figure 1.1 Block Diagram of the Digital Power Meter

1.2 Circuit Configuration and Functions

1.2.1 Voltage Input Circuit

The input signal passes through an input resistor and an analog switch for auto zero and then is supplied to an attenuator consisting of an OP amplifier and voltage dividers.
The attenuation factor of the OP amplifier is 1/160 over the 15 V, 30 V, 60V and 100 V ranges or 1/1600 over the 150 V, 300 V, 600V, and 1000 V ranges.
The output signal from the OP amplifier is further attenuated by 1/1.2, 1/2, 1/4, or 1/8 by voltage dividers and normalized to 750 mV with respect to all range ratings.
The OP amplifier output is connected to the input of the filter circuit and, at the same time, to the OFF side of the ON/OFF switch of the filter. When the filter is turned ON, the OP amplifier output passes through this filter and then is supplied to the final OP amplifier; when it is turned OFF, the OP amplifier output is fed directly to the final OP amplifier which is a buffer amplifier.
The output signal from the final OP amplifier is fed to the A/D converter and to the zero-cross detector circuit.
The A/D converter converts an analog signal into a 16-bit digital signal at a sampling frequency of approximately 60 kHz. After passing through an insulating photo coupler, the digital signal is transferred to the digital signal processor (referred to this later section of DSP Circuit).
The zero-cross detector circuit consists of a comparator circuit whose output signal is fed into the frequency measurement circuit and a discrimination circuit, which determines whether the current signal leads or lags behind the voltage signal.

1.2.2 Current Input Circuit

This circuit has two input sections, which direct input and external sensor input.
The current direct input section:
This section consists of a four-terminal shunt resistor, and current detects directly.
The external shunt input section:
The circuit accepts output signal from the external sensor, and analog switch switches the input signals.
The input signal passes through an analog switch for auto zero and a circuit-protecting diode and then is supplied to an amplifier consisting of an OP amplifier and voltage dividers.
The attenuation factor of the OP amplifier is 30 over the 0.5/1//2 A range, 3 over the 5/10/20A ranges.
The output signal from the OP amplifier is further attenuated by 1/1.25, 1/2.5, 1/5, or 1/4 by voltage dividers and normalized to 375 mV with respect to all range ratings.
The subsequent OP amplifier multiplies the normalized signal 2 times.
The subsequent circuits are the same as those for the voltage input circuit.

1.2.3 DSP Circuit

The DSP circuit consists of a DSP, RAM, an A/D interface (gate array) and a LEAD/LAG detector circuit.

DSP
The DSP is of high-speed type utilizing a 32-bit floating point format, allowing computation of sum of products in 50 ns.

RAM
There are two types of RAM, which the program RAM (for the DSP program) and the working RAM.
When the power is turned on, the DSP program is downloaded to the program RAM from the ROM. The total capacity of the program RAM is 32k words by 48 bits (using six 32k-byte-by-8-bit RAMs).
The total capacity of the working RAM is 64k words by 32 bits (using eight 8k-byte-by-8-bit RAMs).

A/D Interface
The A/D interface is provided with a serial/parallel converter circuit, which converts 16 bits serial data from the A/D converter into one 16-bit data word. A dual-port RAM so that the CPU can read DSP computation results. An interrupt controller, a sampling clock selector, an I/O port, and an address decoder.

Sampling clock selector
There are four sampling clocks: three for normal measurement, and one for harmonic analysis. (The last one is synchronized with the input signal by a PLL circuit.)
The DSP determines which sampling clock is to be used. In normal measurement mode, the first and second clocks are selected in alternation at display update intervals. When variation of the obtained measurement value is detected, the third clock is introduced.

Interrupt controller
The input signals include the end-of-conversion signal (EOC) from the A/D converter, the communication interrupt signal from the CPU (CPUCMD), the measurement start signal (MEST).

I/O port
In addition to the control signal for zero measurement mentioned above, a signal for notification of the end of measurement by the DSP (MEEND) and a signal from the DSP for requesting communication with the CPU (DSPCMD) are used.

Dual-port RAM
When the DSP receive the MEST signal from the CPU, the measurement data are stored in the RAM. The DSP outputs the MEEND signal to allow the CPU to read the measurement data. Then the CPU reads the measurement data from the RAM.

LEAD/LAG Detector
The LEAD/LAG detector circuit determines whether the current signal leads or lags behind the voltage signal based on signals from the voltage and current signal zero-cross detector circuits. The output from the LEAD/LAG detector circuit is connected to the I/O section of the CPU circuit.

1.2.4 CPU Circuit

The CPU component consists of a CPU, ROM CPU interface (gate array), a real-time clock and a key & display controller.

CPU

The CPU is a 16-bit one-chip microcomputer with an interrupt controller, a timer counter, and an I/O port.

CPU Interface

The CPU interface consists of an interrupt controller, an EEPROM control circuit, a frequency measurement circuit, a sampling clock generation circuit, an I/O port, and an address decoder.

Interrupt controller

Controls the end-of-measurement signal (MEEND), the interrupt signal from the real-time clock, voltage and current peak interrupt for the output signal from the input circuite, the signal from the DSP for requesting communication with the CPU (DSPCMD), the key interrupt signal, and the printer interrupt signal.

EEPROM control circuit

Used to control the EEPROM's for storing adjustment data, which are incorporated in the input, the D/A output and input for motor testing circuits.
Each input element incorporates an EEPROM to store calibration data for each element.

Frequency measurement circuit

Used to measure the frequency of the voltage or current input signals, by means of the reciprocal method. This circuit consists of a gate generation counter, an input signal pulse counter, and a reference clock counter.

Sampling clock generation circuit

Output signals are three clocks.
The sampling frequency of each clock is as follows:
53.33kHz, 57.14 kHz, and 61.07 kHz

1.2.5 Normal measurement sequence

The description below corresponds to the Figure 1.2 Time Chart.

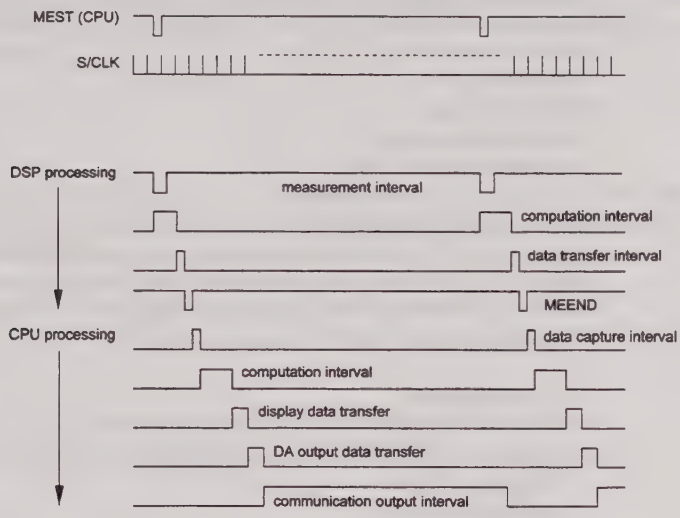


Figure 1.2 Time Chart

The CPU controls the display update interval and measurements within the interval are controlled by the DSP. The display update interval can be classified into the following measurement and computation blocks.

The measuring time differs according to the display update interval as follows:

Display update interval	Number of samples	Measurement time
5 s	Approx. 150000~300000	Approx. 2.5s~5s
2 s	Approx. 60000~120000	Approx. 1s~2s
500 ms	Approx. 15000~30000	Approx. 250ms~500mss
250 ms	Approx. 7500~15000	Approx. 125ms~250mss
100 ms	Approx. 3000~6000	Approx. 50ms~100mss

Auto zero control

The measurement sequence is controlled by the DSP using the CPUCMD signal from the CPU.
In the first stage of the measurement sequence, the offset voltage of the voltage and current circuits is measured.
Zero measurement is performed about 5 ms after the falling edge of the control signal output by the DSP.
The measured zero value is temporarily stored in a register in the DSP and is then corrected by the instantaneous offset value.

Measurement interval

The DSP accepts an end-of-conversion (EOC) interrupt signal from the A/D converter and then starts capturing the instantaneous voltage and current values.
The DSP performs an averaging computation with respect to the instantaneous values at each sampling. When it accepts the MEST signal from the CPU, it ends measurement.
Measured values of voltage, current, and power are computed from their respective instantaneous values.

Computation interval
When the measurement interval is completed, the following computations are performed based on the voltage (V), the current (I), and the power (W) measured in the interval.
Rated value conversion
Apparent power (VA)
Reactive power (var)
Power factor (PF)
Phase angle (deg)
Moving average value
Exponential average value

Data transfer interval
This interval is for transferring the values measured by the DSP to the CPU. During this interval, the DSP writes the measurement data to the dual-port RAM in the A/D interface (gate array). When the write operation is completed, the DSP outputs the end-of-measurement signal (MEEND) signal to the CPU.

CPU processing
When the CPU receives the MEEND signal from the DSP, it reads data from the measurement data RAM and then performs the following processing:
Range conversion
Scaling computation
Display data output
DA output
Communication data output
Printer data output

1.2.6 Harmonic analysis function

This Model uses the PLL method in which the sampling frequency is synchronized with the input signal.
The sampling frequency is set to a value which is 2048, 1024, 512, 256, or 128 times the input signal frequency depending on the input frequency measurement result and controlled by the CPU.
The PLL circuit is mounted on the communication board.
The following describes the case when a commercial frequency is used as the input signal.
The sampling frequency is 512 times the input frequency, allowing sample data for 16 periods to be stored in the internal memory. While this Model is performing FFT analysis for the stored sample data, it stores sample data for the next 16 periods in the memory, thus realizing uninterrupted analysis in units of 16 waveforms.
The window function at FFT analysis is a rectangular window and the data length for FFT operation are 8192 points.
The analysis items include:

- Voltage value, current value, and active power value (for the fundamental to the 50th harmonic components)
- Components of the voltage, current, and power (for the fundamental to the 50th harmonic components)
- Content of harmonic components of voltage, current, and power (for the 2nd to the 50th harmonic components)
- Distortion factor of voltage and current
- Phase angle between voltage and current fundamental components
- Phase angle of each voltage harmonic component with respect to the voltage fundamental component
- Phase angle of each current harmonic component with respect to the current fundamental component

The above analysis items are analyzed at the same time by the DSP on each input module.

1.2.7 Printer

The printer consists of an eight-bit sub-CPU, a ROM, a controller, a FIFO buffer, and a printing mechanism. Measurement data are transferred from the CPU to the sub-CPU, which then writes print data to the FIFO buffer. The controller reads these data for print control.

1.2.8 D/A output

Uses a 12-bit D/A converter of successive approximation type, with voltage output. The D/A board incorporates an EEPROM to store correction data for output voltage correction.

Chapter 2 TESTING

This chapter describes the following tests.
2.1 Acceptance test
2.2 Self Diagnosis test
2.3 Performance test

2.1 Acceptance Test

This section describes the procedure to perform the acceptance test.

1 Read preface 'Checking Package Contents' of the User's Manual and verifies that the Digital Power Meter is complete with accessories.
2 Make sure to understand the operating procedures as described in the User's Manual.
3 Check each function using the User's Manual.
4 Read and implement section 2.2 'Self Diagnosis Test'.
5 Read and implement section 2.3 'Performance Test'.

2.2 Self Diagnosis Test

The Digital Power Meter is provided with complete self-diagnosis functions to enhance reliability in measurement and serviceability.
These functions can be divided into three categories:

• Power Up Self Diagnosis Functions (automatically performed checks)
Power up self diagnosis functions are a series of self diagnosis functions executed automatically immediately after the power of the Digital Power Meter has been turned ON.
They are executed in a fixed sequence through the control of the built-in microprocessor. On completion of this self-diagnosis, the Digital Power Meter enters its normal operating state.

• Self Diagnosis Started Manually (manually performed checks)
Self diagnosis started by manual operation includes those self diagnosis functions triggered by a particular panel key operation executed by the user.
The self-diagnosis functions are performed by the built-in microprocessor with the results being shown on the display.

• On-Line Self Diagnosis Functions (error messages / warning messages)
On-line self-diagnosis functions are carried out when the Digital Power Meter is in its normal operating state.
Any abnormalities detected following program execution by the built-in microprocessor are shown on the display as error or warning messages.

2.2.1 Power Up Self Diagnosis Functions

Power up self diagnosis functions are a series of self diagnosis functions executed automatically immediately after the power of the Power Meter has be turned ON. They are executed in a fixed sequence through the control of the built-in microprocessor. On completion of this self-diagnosis, the Power Meter enters its normal operating state.

Table 2.1 Details of Power Up Self Diagnosis Functions

No.	Test	Display at start	Display at normal completion	Display / Operation at failure detection	Execution time
1	System ROM test	tESt (display D)	All LED's light	Err 79 Operation will stop	0.8s
2	System RAM test	tESt (display D)	All LED's light	Err 80 Operation will stop	1.3s
3	DSP test	tESt (display D)	All LED's light		
	communications			Err 71 Operation will stop	
	program RAM			Err 75 Operation will stop	
	data RAM			Err 81 Operation will stop	
	dual port RAM			Err 84 Operation will stop	
4	Board Check checks whether all boards are there or not	tESt (display D)	All LED's light.	Continue	
5	Communication board check	tESt (display D)	All LED's light	Err 70 Continue	
6	Board combination test	tESt (display D)	All LED's light	Err 90 Operation will stop	
7	Backup battery test	tESt (display D)	All LED's light	Err 69 Continue	
8	Parameter RAM test	tESt (display D)	All LED's light	Err 60 Continue	
9	All LED's	All LED's light		Continue	
10	Options test	2536 (display A) ROM ver (display B)			
	D/A	dA (display C)			
	Printer	Print (display C)			
	Harmonics	Harm (display C)			
	Integrator	IntEG (display C)		Continue	
	External sensor	Ext.SEn (display C)			
	Waveform output	W-ForM (display C)			
	Motor evaluation	Motor (display C)			
	GP-IB (or RS232C)	Refer to IM			
11	EEPROM test for INPUT (each element)			Err 61;(Element 1 failure) Continue Err 62;(Element 2 failure) Continue Err 63;(Element 3 failure) Continue	
	when interface = GP-IB	GPib (display C) Adrr** (display D)	GPib (display C) Adrr** (display D)		
	when interface = RS-232-C	HAnd* (display B) For* (display C) br**** (display D)	HAnd* (display B) For* (display C) br**** (display D)		
12	Sampling clock check (each element)	same as above	same as above	Err 65;(Element 1 failure) Continue Err 66;(Element 2 failure) Continue Err 67;(Element 3 failure) Continue	
13	EEPROM test for motor board	same as above	same as above	Err 68 Continue	
14	EEPROM test for DA (option)	same as above	Same as above	Err 64 Continue	

15	Printer test				
	FIFO test (by CPU)	same as above	same as above	Err 74 Printer will not operate.	
	FIFO test (by sub CPU)	same as above	same as above	Err 74 Printer will not operate.	waits 5 sec
	RAM test (by sub CPU)	same as above	same as above	Err 87 Printer will not operate.	
	Communication between sub CPU and printer	same as above	same as above	Err 73 Printer will not operate.	

2.2.2 Self-Diagnosis Started Manually

The self-diagnosis functions are performed by the built-in microprocessor with the results being shown on the display.
There are three tests, which can be started manually.
These tests concern the LED's, keys, and printer.

Procedure to enter the test mode

1 Press the switch located at the rear panel underneath the External I/O connector by inserting a screwdriver or similar into the round hole.
2 Display D will appear "CAL" or "tESt" or "ZEro" or "End". Select "tESt" using the cursor-key and press the ENTER-key.
3 The test menu consists of the following four items.
Select the one appropriate for you and press the ENTER-key.

• Testing the LED's

In this mode the LED's will each be tested for three seconds in the following sequence.
1 Display A, B, C and D will each shows the digits from 0 to 9. The "unit", "8" and "." will be displayed as well. (before Ver. 2.06)
Display A, B, C and D will shows each segments will be displayed as well. (after Ver. 2.06)
2 All LED's of block A of figure 2.1 will light up.
3 All LED's of block B of figure 2.1 will light up.
4 All LED's of block C of figure 2.1 will light up.

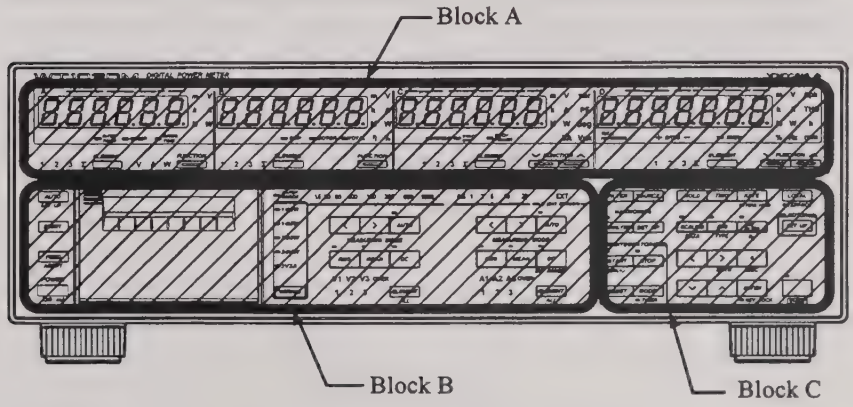


Figure 2.1 Testing the LED's

• Testing the keys

When pressing a key in this mode, the number corresponding to the key as shown in the figure 2.2 below, will appear on display D.

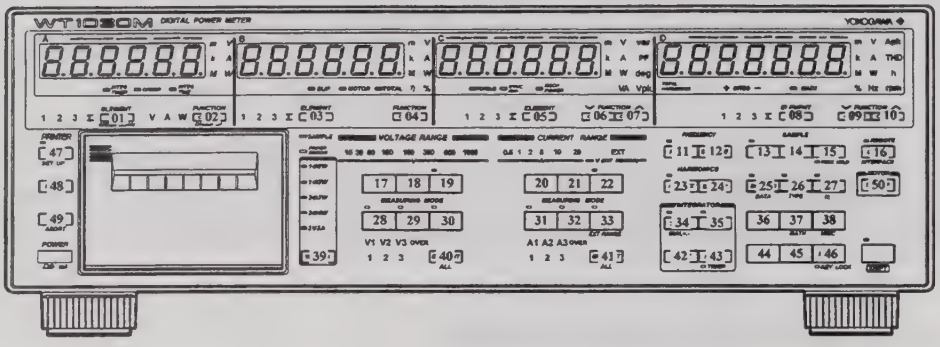


Figure 2.2 Testing the keys

• Testing the printer (If option /B5 installed)

When selecting "Prt" and pressing the ENTER-key, the printer will execute a preset printing.

When you finished self-diagnosis testing

Select "End", press the ENTER-key and you will get out of the testing mode.

2.3 Performance Test

This section describes several tests to verify the operation of the Digital Power Meter performance against published publications.

2.3.1 Before You Begin
2.3.2 Connection diagrams
2.3.3 Key Operation Check
2.3.4 Communication Operation Check
2.3.5 Voltage Accuracy Test
2.3.6 Current Accuracy Test
2.3.7 Power Accuracy Test
2.3.8 Integrator Accuracy Test (When option /INTEG installed)
2.3.9 Frequency Accuracy Test
2.3.10 D/A Output Accuracy Test (When option /DA installed)
2.3.11 Harmonic Analysis Accuracy Test (When option /HARM installed)
2.3.12 Remote Control Operation Check
2.3.13 Waveform Output Operation Check
2.3.14 Motor Evaluation Function Test (For WT1030M only)

2.3.1 Before You Begin

• Testing Conditions

When carrying out the performance tests described on the following description, make sure that the User's is tested under the following conditions:

Ambient temperature: 23 ± 5℃
Humidity: 45 to 75% RH
Power supply voltage: rated voltage ± (rated voltage × 5%)
Power supply frequency:see NOTE below

• Preparation

Before carrying out the performance tests described on the following description, proceed as follows:

1 Turn ON the power supply and verify that the Digital Power Meter passes the self-diagnostic functions without any problems.
2 Allow a warming-up time of at least 30 minutes for required instruments and the target Digital Power Meter.

NOTE

Power supply frequency setting as follows:
When the power supply frequency of the target Digital Power Meter is 50Hz, set the output frequency of the AC generator to 60Hz. And, on the other hand, if the power supply frequency of the target Digital Power Meter is 60Hz, then set the output frequency of the AC generator to 50Hz.
The reason is that, use difference frequency because of prevention for interference of beet arise depend on a few difference frequency when using same power frequency of the target Digital Power Meter and the AC generator.

• **Required Instruments:**

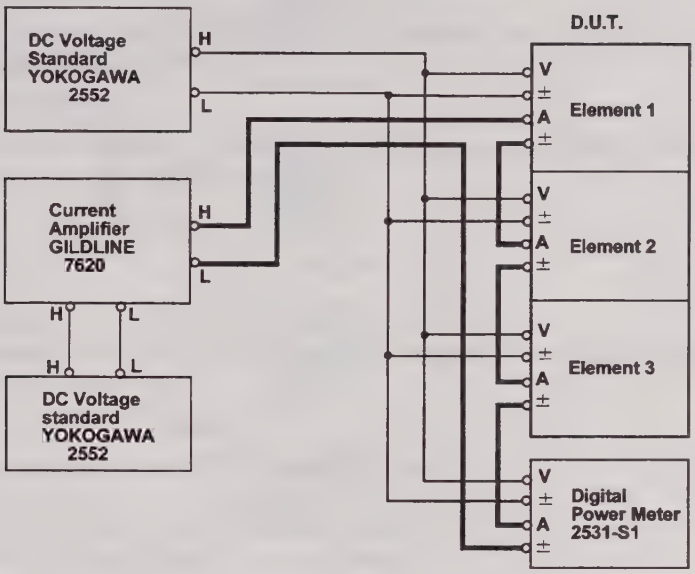
Instrument	Critical Specification	Recommended
Referenced Digital Power Meter	Accuracy 30Hz to 1kHz : ±(0.03% of reading + 0.05% of range)	YOKOGAWA 2531-S1 * see below description
DC voltage standard	Accuracy 50ppm of setting Resolution 1000mV Range : 1nV 10V Range : 0.1mV 100V Range : 1mV 1000V Range : 1mV	YOKOGAWA 2552-02
AC voltage standard (Enable to synchronize)	Accuracy 30Hz to 20kHz : ±(0.02% of setting + 0.002% of range) Resolution 0.0001% of range	FLUKE 5200A
Power amplifier	Band-width ≧ 100kHz	FLUKE 5205A
Current amplifier	Max. current 20A Band-width ≧ 300kHz	GILDLINE 7620
Digital Multimeter	Accuracy DC V : 40ppm	YOKOGAWA 7561
Two channel Function Generator	Accuracy ±20ppm	YOKOGAWA FG120
Oscilloscope	Band-width ≧100MHz	YOKOGAWA DL1200
Personal Computer	With GP-IB/RS-232-C interface	

* This is a special model that produced for very precisely accuracy and traced on national standard.

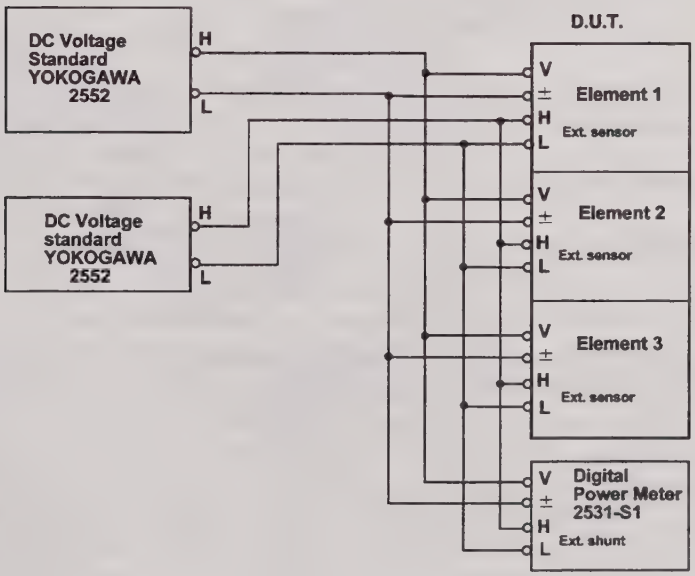
2.3.2 Connection Diagrams

• Figure 2.3 connection for the DC accuracy Test

Connection for direct input

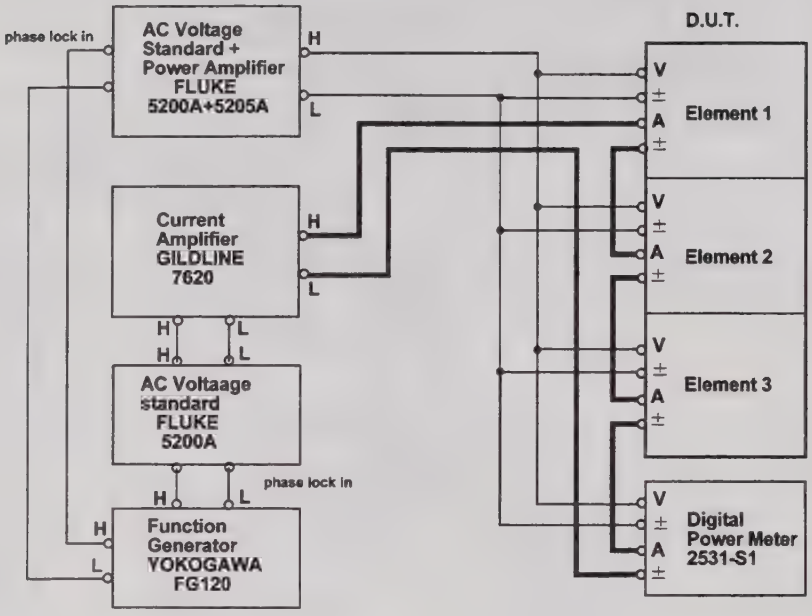


Connection for external sensor input

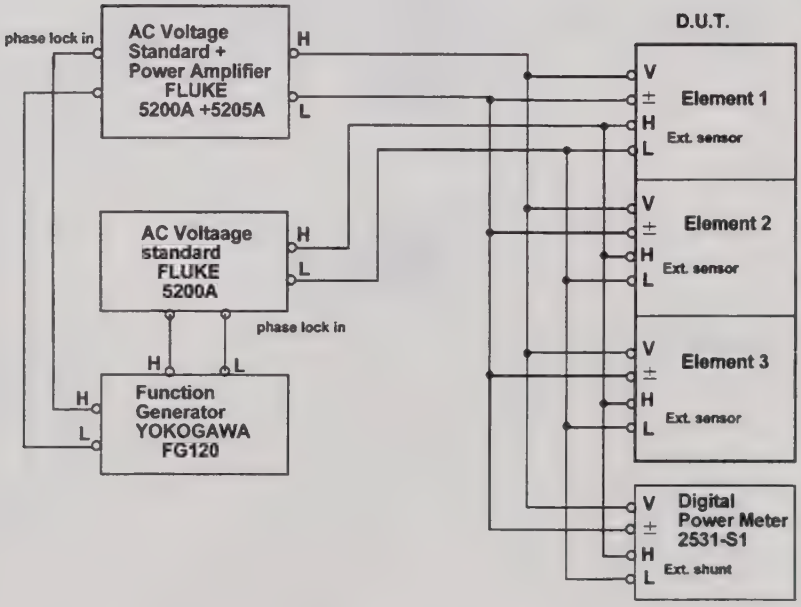


• **Figure 2.4 connection for the AC accuracy Test**

Connection for direct input



Connection for external sensor input



2.3.3 Key Operation Check

Verify that each key is operable as usual.

2.3.4 Communication Operation Check

GP-IB Interface

Use a controller with a GP-IB interface to verify that range and function can be set, and that data can be received correctly.

RS-232-C Interface

Use a controller with a RS-232-C interface to verify that range and function can be set, and that data can be received correctly.

2.3.5 Voltage Accuracy Test

• Connection

Connect according to figure 2.3 when the dc accuracy test, and according to figure 2.4 when the ac accuracy test.

• Range Test and Frequency Characteristics Test

Procedure

1 Set the Device Under Test and 2531-S1 as follows:

DISPLAY UPDATE RATE	: 500ms
SCALING	: OFF
LINE FILTER	: OFF
RMS/MEAN/DC	: when ac testing set to RMS, and * indicate in the below table also test MEAN
	: when dc testing set to DC
AVG	: OFF
EXT INPUT	: 0.2000/A

2 Apply ac and dc voltage to the D.U.T. using the voltage standard with the test frequency below, and adjust the output of the voltage standard to the measured value of the digital power meter 2531-S1 just testing input voltage.

3 Verify for each range each element that the D.U.T. indicates a value lies within the accuracy below table.

4 When the model 253620, 253630, and 253640 also verify ΣV at 100V/60Hz point that the D.U.T. indicates a value lies within the accuracy below table.

Range	Input voltage	Frequency						
		DC	10Hz	50/60Hz	1kHz	10kHz	50kHz	100kHz
15V	15V			Test				
30V	30V			Test				
60V	60V			Test				
100V	100V	Test	Test	*Test	Test	Test	*Test	Test
150V	100V	Test	Test	Test	Test	Test	Test	Test
300V	300V			Test				
600V	600V			Test				
1000V	600V			Test				
Accuracy ±(rdg + rdg)	rdg	0.1%	0.1%	0.1%	0.1%	0.8%	2.0%	4.0%
	rng	0.2%	0.3%	0.1%	0.2%	0.3%	0.7%	0.7%

• Linearity Test

1 Set the Device Under Test and 2531-S1 as follows:

DISPLAY UPDATE RATE	: 500ms
SCALING	: OFF
LINE FILTER	: OFF
RMS/MEAN/DC	: when ac testing set to RMS
	: when dc testing set to DC
AVG	: OFF
VOLTAGE RANGE	: 100V

2 Apply ac and dc voltage to the D.U.T. using the voltage standard with the test frequency below, and adjust the output of the voltage standard to the measured value of the digital multimeter just testing input voltage.

3 Verify that the D.U.T. indicates a value lies within the accuracy below table.

	Accuracy	Test voltage		
DC	±0.2% of rng	10V	60V	110V
50/60Hz	±0.1% of rng	10V	60V	110V

2.3.6 *Current Accuracy Test*

• Connection

Connect according to figure 2.3 when the dc accuracy test, and according to figure 2.4 when the ac accuracy test.

• Range Test and Frequency Characteristics Test

Procedure

1 Set the Device Under Test and 2531-S1 as follows:

DISPLAY UPDATE RATE	: 500ms
SCALING	: OFF
LINE FILTER	: OFF
RMS/MEAN/DC	: when ac testing set to RMS, and *[1] indicate in the below table also test MEAN
	: when dc testing set to DC
AVG	: OFF

When the test range 500mA, 2531-S1 range set to 5A.

2 Apply ac and dc current to the D.U.T. using the current amplifier with test frequency below, and adjust the output of the function generator to the measured value of the digital power meter 2531-S1 just testing input current.

*[2] is indicates the external sensor range testing (when installed option /EX1 or /EX2): Apply dc voltage to the D.U.T. using the function generator, and adjust the output of the function generator to the measured value of the digital power meter 2531-S1 just testing input voltage.

3 Verify for each range each element that the D.U.T. indicates a value lies within the accuracy below table.

4 When the model 253620, 253630, and 253640 also verify ΣA at 1A/60Hz point that the D.U.T. indicates a value lies within the accuracy below table.

Range	Input current	Frequency						
		DC	10Hz	50/60Hz	1kHz	10kHz	50kHz	100kHz
500mA	500mA			Test				
1A	1A	Test	Test	Test	Test	Test	Test	Test
2A	2A			Test				
5A	5A			Test				
10A	10A	Test	Test	*1Test	Test	Test	*1Test	Test
20A	20A			Test				
*2250mV	*2200mV	Test		Test	Test			Test
Accuracy ±(rdg + rdg)	rdg	0.1%	0.1%	0.1%	0.1%	0.8%	2.0%	4.0%
	rng	0.2%	0.3%	0.1%	0.2%	0.3%	0.7%	0.7%

• Linearity Test

1 Set the Device Under Test and 2531-S1 as follows:

DISPLAY UPDATE RATE	: 500ms
SCALING	: OFF
LINE FILTER	: OFF
RMS/MEAN/DC	: when ac testing set to RMS
	: when dc testing set to DC
AVG	: OFF
VOLTAGE RANGE	: 1A

2 Apply ac and dc current to the D.U.T. using the current amplifier with test frequency below, and adjust the output of the function generator to the measured value of the digital power meter 2531-S1 just testing input current.

3 Verify that the D.U.T. indicates a value lies within the accuracy below table.

	Accuracy	Test current		
DC	±0.2% of rng	0.1A	0.6A	1.1A
50/60Hz	±0.1% of rng	0.1A	0.6A	1.1A

2.3.7 Power Accuracy Test

• Connection

Connect according to figure 2.3 when the dc accuracy test, and according to figure 2.4 when the ac accuracy test.

• Range Test and Frequency Characteristics Test

Procedure

1 Set the Device Under Test and 2531-S1 as follows:

DISPLAY UPDATE RATE	: 500ms
SCALING	: OFF
LINE FILTER	: OFF
RMS/MEAN/DC	: when ac testing set to RMS
	: when dc testing set to DC
AVG	: OFF

When the test range 500mA, 2531-S1 range set to 5A.

2 Apply ac and dc voltage and current to the D.U.T. using same way as voltage and current test.
* is indicates the external sensor range testing (when installed option /EX1 or /EX2)

3 Adjust phase between voltage and current input to maximize the measured value of the 2531-S1 so as to minimize the substantial phase delay (so become cos ϕ =1).

4 Verify for each range each element that the D.U.T. indicates a value lies within the accuracy below table.

5 When the model 253620, 253630, and 253640 also verify ΣW at 100V/60Hz point that the D.U.T. indicates a value lies within the accuracy below table.

Voltage range/input	Current range/input	Frequency						
		DC	10Hz	50/60Hz	1kHz	10kHz	50kHz	100kHz
15V/15V	1A/1A			Test				
30V/30V	↓			Test				
60V/60V	↓			Test				
100V/100V	↓	Test	Test	Test	Test	Test	Test	Test
150V/100V	↓	Test	Test	Test	Test	Test	Test	Test
300V/300V	↓			Test				
600V/600V	↓			Test				
1000V/600V	↓			Test				
100V/100V	500mA/500mA			Test				
↓	1A/1A	Test	Test	Test	Test	Test	Test	Test
↓	2A/2A			Test				
↓	5A/5A			Test				
↓	10A/10A	Test	Test	Test	Test	Test	Test	Test
↓	20A/20A			Test				
↓	*250mV/200mV	Test		Test	Test			Test
Accuracy ±(rdg + rdg)	rdg	0.2%	0.2%	0.1%	0.2%	0.9%	3.0%	6.0%
	rng	0.3%	0.5%	0.1%	0.2%	0.4%	1.0%	1.0%

• Linearity Test

1 Set the Device Under Test and 2531-S1 as follows:

DISPLAY UPDATE RATE	: 500ms
SCALING	: OFF
LINE FILTER	: OFF
RMS/MEAN/DC	: RMS
AVG	: OFF
VOLTAGE RANGE	: 100V
CURRENT RANGE	: 5A

2 Apply ac and dc voltage and current to the D.U.T. using same way as range and frequency characteristics test.
Test frequency is 50/60Hz and test points follow below table.

Test voltage	10V	60V	110V
Test current	5A	→	→

3 Verify that the D.U.T. indicates a value lies within the accuracy.
Accuracy: ±0.1% of range (at 50/60Hz)

2.3.8 Integrator Accuracy Test (If option /INTEG installed)

Procedure

1 Connect according to figure 2.4.
2 Set the Device Under Test as follows:

VOLTAGE/CURRENT RANGE	: 100V/1A
MEASURING MODE	: RMS

3 Apply a 100V/1A ac (50/60Hz) with cos ϕ =1 to the D.U.T.
4 Set integration timer to one minute, and then START.
5 When timer time-up, verify that the integration value lies within the tolerance below.
Wh:
±((0.15% of reading + 0.1% of range)
Ah (RMS):
±((0.15% of reading + 0.1% of range)

2.3.9 Frequency Accuracy Test

Procedure

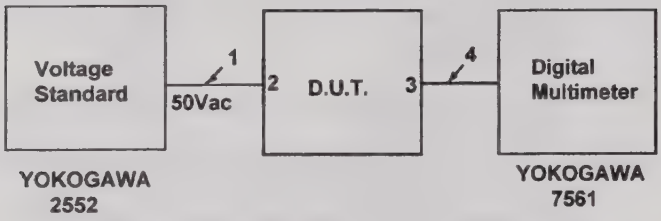
1 Connect according to figure 2.4.
2 Set the Device Under Test as follows:

SAMPLE RATE	: 500ms
VOLTAGE/CURRENT RANGE	: 100V/1A
LOW PASS FILTER	: OFF
LINE FILTER	: OFF

3 Apply a 100V/1A ac (20kHz) to the D.U.T.
4 Verify that the frequency measured value lies within tolerance below.
The measuring accuracy: ±0.05% of reading + 1digit

2.3.10 D/A Output Accuracy Test (When option /DA installed)

• **Connection**



1 Banana to banana cable
2 Voltage input terminal of the element 1
3 External input/oputput connector
4 36 pin connector to banana cable

Pin assignment of the external I/O connector

Pin No.	Signal Name	Pin No.	Signal Name
10	D/A GND	28	D/A GND
11	D/A GND	29	D/A GND
12	D/A CH1	30	D/A CH2
13	D/A CH3	31	D/A CH4
14	D/A CH5	32	D/A CH6
15	D/A CH7	33	D/A CH8
16	D/A CH9	34	D/A CH10
17	D/A CH11	35	D/A CH12
18	D/A CH13	36	D/A CH14

Figure 2.5 Connection for the D/A Output Accuracy Test

• **Procedure**

1 Set the Device Under Test as follows:

DISPLAY UPDATE RATE	: 500ms
SCALING	: OFF
LINE FILTER	: OFF
RMS/MEAN/DC	: RMS
AVG	: OFF
D/A OUTPUT	: V1
VOLTAGE RANGE	: 100V

2 Connect according above figure.
3 Set the Function of the Digital Multimeter to AC V.
4 Apply 50Vac(50/60Hz) to the D.U.T. using the ac voltage standard, and adjust the output it to the measured value of the V1 lies within 50V±0.001V.
5 Verify that the D/A output voltage depend on read value of the Digital Multimeter lies within the accuracy.
Accuracy: ±0.2% of range by means of display value
6 Regarding to D/A Output Channel 1 to 14.

2.3.11 Harmonic Analysis Accuracy Test (When option /HARM installed)

• Connection

Connect the same as case of ac test, and use them same way.

• Procedure

1 Set the Device Under Test as follows:
   ANTI-ALIASING FILTER : ON
   VOLTAGE RANGE : 100V
   CURRENT RANGE : 1A
2 Apply 100V/1A ac, cos ϕ =1 with frequency below table to the D.U.T.
3 Turn ON the harmonic analysis function.
4 Verify that the displayed value within the accuracy for each items as following table.

Analyzed function	Voltage	Voltage	Voltage
Test point	500Hz	1kHz	2.5kHz
Harmonic order	1	10	25
PLL source	V1	A1	A1
Voltage fundamental frequency	500Hz		
Current fundamental frequency		100Hz	100Hz
Accuracy	(1.0% of rdg + 0.1% of rng)	(1.0% of rdg + 0.2% of rng)	(2.0% of rdg + 0.3% of rng)
Analyzed function	Current	Current	Current
Test point	500Hz	1kHz	2.5kHz
Harmonic order	1	10	25
PLL source	V1	V1	V1
Voltage fundamental frequency	500Hz	100Hz	100Hz
Current fundamental frequency			
Accuracy	(1.0% of rdg + 0.1% of rng)	(1.0% of rdg + 0.2% of rng)	(2.0% of rdg + 0.3% of rng)
Analyzed function	Power		
Test point	500Hz		
Harmonic order	1		
PLL source	V1		
Voltage fundamental frequency	500Hz		
Current fundamental frequency	500Hz		
Accuracy	(2.0% of rdg + 0.2% of rng)		

2.3.12 Remote Control Operation Check

Input external signal of EXT HOLD, EXT TRIG, and EXT PRINT (When option /B5 installed) to the D.U.T.
Verify that its operation is as usual.

2.3.13 Waveform Output Operation Check (When the option /WF installed)

• Procedure

1 Set the Device Under Test as follows:
   VOLTAGE RANGE : 100V
   CURRENT RANGE : 1A
2 Apply 100V/1A ac (50/60Hz) to the D.U.T.
3 Check that waveform output value leis within 2Vrms±10% using an oscilloscope.

2.3.14 Motor Evaluation Function Test (For WT1030M only)

• **Connection**

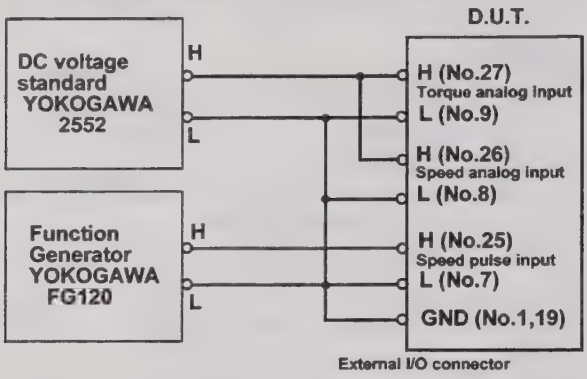


Figure 2.6 Connection for the Motor Evaluation Function Test

• **Procedure**

Test section for torque analog input:

1 Set the Device Under Test as follows:

DISPLAY UPDATE RATE	: 500ms
SCALING VALUE FOR TORQUE	: 2000.0(Nm)

2 Apply 5Vdc(50% of full-scale) for torque input using DC standard.

3 Verify that the measured value of torque lies within the accuracy.
Accuracy: ±(0.1% of reading + 0.1% of full-scale)

Test section for speed analog input:

4 Set the Device Under Test as follows:

DISPLAY UPDATE RATE	: 500ms
SCALING VALUE FOR ROTATING SPEED	: 2000.0(rpm)
INPUT FOR ROTATING SPEED	: Analog

5 Apply 5Vdc(50% of full-scale) for speed analog input using DC standard.

6 Verify that the measured value of rotating speed lies within the accuracy.
Accuracy: ±(0.1% of reading + 0.1% of full-scale)

Test section for speed pulse input:

7 Set the Device Under Test as follows:

DISPLAY UPDATE RATE	: 500ms
INPUT FOR ROTATING SPEED	: pulse
NUMBER OF PULSE	: 60(pulse/revolution)

8 Apply 1Vrms sine wave (1kHz), for speed pulse input using function generator.

9 Verify that the measured value of rotating speed lies within the accuracy.
Accuracy: ±(0.05% of reading + 2digits)

Chapter 3 REPLACING PARTS

This chapter describes how to handle in case parts need to be replaced, either because of preventive maintenance or because of failure.

3.1 Replaceable Parts
3.2 When Repair is Necessary
3.3 Replacing the Fuse
3.4 Replacing the Battery

3.1 Replaceable Parts

When replacement of parts is necessary, we strongly recommend replacement with an assembly unit. YOKOGAWA instruments have been designed in a way that the replacement of parts can be done on an assembly (module) basis by the user.

Parts supplied by YOKOGAWA are listed in the Customer Maintenance Parts List (CMPL), See chapter 7. Smaller parts than listed in the CMPL are not supplied.

The CMPL comprises the following:

- Item number
- YOKOGAWA parts number
- Quantity
- Description

3.2 When Repair is Necessary

When a repair is necessary, clearly state the information listed below and forward it to the nearest sales representative or service center. Addresses may be found on the back cover of this manual.

- Your address
- Name and telephone number of person in charge
- Model code and suffix code of the instrument, which can be found on the nameplate. The nameplate is located at the rear panel of the instrument.
- Detailed explanation of the problem, including taken measures and displayed messages.

3.3 Replacing the Fuse

If the power supply fuse blows, replace it depend on following description.

WARNING

Use only the specified fuses, if using any other fuses could cause fire.

- The fuse used must be of the specified rating in order to prevent a fire hazard. Never use a fuse of any other rating, and never short-circuit the fuse holder to bypass the fuse.
- Do not operate the instrument if you have any reason to suspect any defect or problem with the fuse.

Specified fuses table

Part Number	specified	Remarks
A1353EF	250V/5.0A, Time-lug type	

The procedure to replace the fuse:

1 Turn OFF the power switch
2 Disconnect the power cord from the power connector of the instrument.
3 Refer figure 3.1 below. Place the tip of a flat-blade screwdriver in to the slot of the fuse holder, and move the screwdriver in the direction of the arrow to remove the fuse holder.
4 Remove the fuse.
5 Insert the new fuse into the holder, then install the holder in place.

Power supply fuse holder is located next to the power connector.

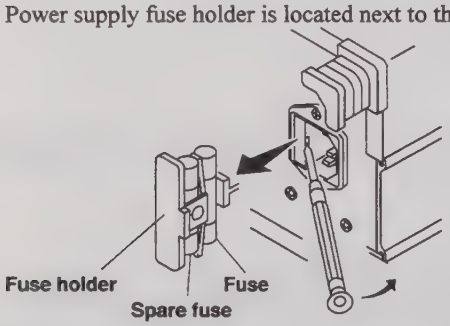


Figure 3.1 Fuse illustration

Chapter 4 ADJUSTMENTS

This chapter describes how to adjust a 2536 Digital Power Meter. Adjustment is required when the performance test has resulted in excessive error in the tolerance or after replacing the input board, D/A board, and motor evaluation board.
This chapter consists of the following sections.

4.1 Before You Begin
4.2 Range Adjustment
4.3 D/A Output Adjustment (When install the option /DA)
4.4 Range Adjustment for Motor Evaluation (When the Model WT1030M only)

Adjustments are normally carried out in the sequence as above, but the adjustments may be carried out in any sequence.

4.1 Before You Begin

• Introduction
Adjustment can be done either manually or by communication interface.

• Adjusting Conditions
When carrying out the adjustments described on the following pages, make sure that the instrument is under the following conditions:

Ambient temperature:	23 ± 2°C
Humidity:	45 to 75% R.H.
Power supply voltage:	rated voltage ± (rated voltage × 5%)
Power supply frequency:	see NOTE below

• Preparation
Before carrying out the adjustment described in the following pages proceeds as follows:

1 Turn ON the power supply and verify that the target Digital Power Meter passes the self-diagnostic function without any problem.
2 Allow a warming-up time of at least 30 minutes for required instruments and the target Digital Power Meter.

NOTE

Power supply frequency setting as follows:
When the power supply frequency of the target Digital Power Meter is 50Hz, set the output frequency of the AC generator to 60Hz. And, on the other hand, if the power supply frequency of the target Digital Power Meter is 60Hz, then set the output frequency of the AC generator to 50Hz.
The reason is that, use difference frequency because of prevention for interference of beet arise depend on a few difference frequency when using same power frequency of the target Digital Power Meter and the AC generator.

WARNING

Before disassembling, disconnect all power sources from the main body as follows:
• Turn off the power switch
• Disconnect the power cable
• Disconnect the I/O cable.
When the cover has been removed, do not touch voltage live parts.
Before turning on the power, make sure there is no short-circuit.

Required Instruments:

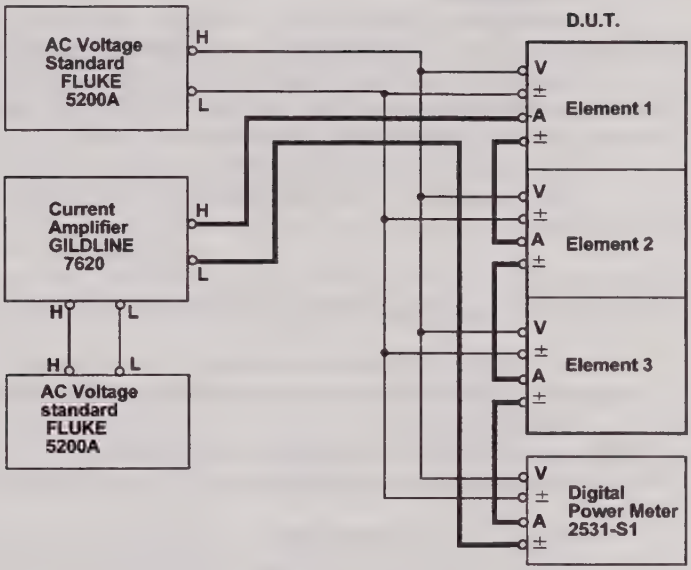
Instrument	Critical Specification	Recommended
Referenced Digital Power Meter	Accuracy 30Hz to 1kHz : ±(0.03% of reading + 0.05% of range)	YOKOGAWA 2531-S1 * see below description
AC voltage standard (Enable to phase locking)	Accuracy 30Hz to 20kHz : ±(0.02% of setting + 0.002% of range) Resolution 0.0001% of range	FLUKE 5200A
DC voltage standard	100V Range : Accuracy ±0.005% of setting Resolution 100μV	YOKOGAWA 2552-02
Current Amplifier	Max. current 20A Band-width ≧ 300kHz	GUILDLINE 7620
Digital Multi Meter	Accuracy DC V : 40ppm	YOKOGAWA 7561

* This is a special model that produced for very precisely accuracy and traced on national standard.

4.2 Range adjustment

• **Connection**

Connection for direct input



Connection for external sensor input

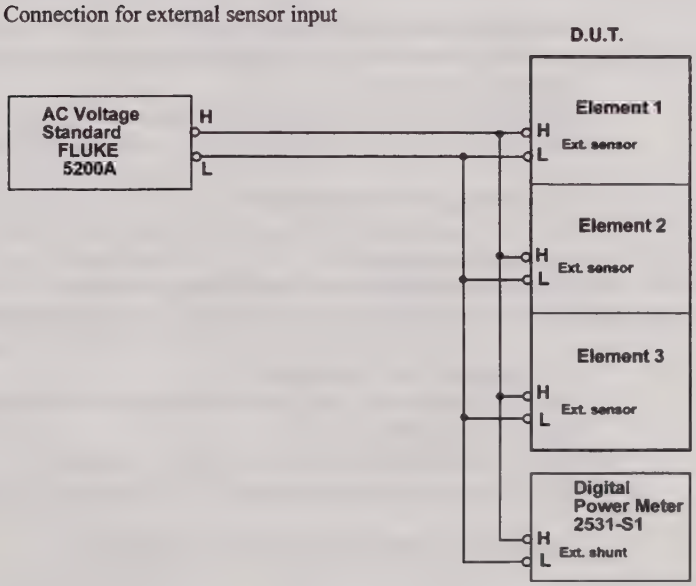


Figure 4.1 Connection for voltage, current, and external sensor range adjustment

• Adjustment Range

15V,30V,60V,100V,150V
1A,2A,5A,10A and external sensor

• Procedure

Entering the adjustment mode

1 Press the switch located at the rear panel underneath the External I/O connector by inserting a screwdriver or similar into the round hole.
2 Display D will appear "CAL" or "tESt" or "ZEro" or "End". Select "CAL" using the cursor-key and press the ENTER-key.
3 Then display D will appear "rAnGE" or "dA" or "Motor" or "End". Select "rAnGE" using the cursor-key and press the ENTER-key. So that enter the range adjustment mode

4 Connect according to the figure 4.1 part of direct input.

Voltage range 15V adjustment

5 The D.U.T. enters the 15V range adjustment mode automatically and "15.000" is displayed on display A.
6 Apply 15ac (50/60Hz) using AC voltage standard.
7 When the value shown on display A, B, C becomes stabilized, press the ENTER key.

Voltage range 30V adjustment

8 The D.U.T. enters the 30V range adjustment mode automatically and "30.000" is displayed on display A.
9 Apply 30Vac (50/60Hz) using AC voltage standard.
10 When the value shown on display A, B, C becomes stabilized, press the ENTER key.

Voltage range 60V adjustment

11 The D.U.T. enters the 60V range adjustment mode automatically and "60.000" is displayed on display A.
12 Apply 60Vac (50/60Hz) using AC voltage standard.
13 When the value shown on display A, B, C becomes stabilized, press the ENTER key.

Voltage range 100V adjustment

14 The D.U.T. enters the 100V range adjustment mode automatically and "100.00" is displayed on display A.
15 Apply 100Vac (50/60Hz) using AC voltage standard.
16 When the value shown on display A, B, C becomes stabilized, press the ENTER key.

Voltage range 150V adjustment

17 The D.U.T. enters the 150V range adjustment mode automatically and "150.00" is displayed on display A.
18 Apply 150Vac (50/60Hz) using AC voltage standard.
19 When the value shown on display A, B, C becomes stabilized, press the ENTER key.

20 Turn OFF the output of the AC voltage standard.

Current range 1A adjustment

21 The D.U.T. enters the 1A range adjustment mode automatically and "1.0000" is displayed on display A.
22 Apply 1Aac (50/60Hz) using AC Voltage standard and current amplifier.
23 When the value shown on display A,B,C becomes stabilized, press the ENTER key.

Current range 2A adjustment

24 The D.U.T. enters the 2A range adjustment mode automatically and "2.0000" is displayed on display A.
25 Apply 2Aac (50/60Hz) using AC Voltage standard and current amplifier.
26 When the value shown on display A, B, C becomes stabilized, press the ENTER key.

Current range 5A adjustment

27 The D.U.T. enters the 5A range adjustment mode automatically and "5.0000" is displayed on display A.
28 Apply 5Aac (50/60Hz) using AC Voltage standard and current amplifier.
29 When the value shown on display A, B, C becomes stabilized, press the ENTER key.

Current range 10A adjustment

30 The D.U.T. enters the 10A range adjustment mode automatically and "10.000" is displayed on display A.
31 Apply 10Aac (50/60Hz) using AC Voltage standard and current amplifier.
32 When the value shown on display A, B, C becomes stabilized, press the ENTER key.

33 Turn OFF the output of the current amplifier.

External sensor range adjustment (When installed the option /EX1 or /EX2)

34 Connect according to figure 4.1 part of sensor input.
35 The D.U.T. enters the 10V external sensor range adjustment mode automatically and "10.000" is displayed on display A.
36 Apply 10Vac (50/60Hz) using AC voltage standard.
37 When the value shown on display A,B,C becomes stabilized, press the ENTER key.

38 Turn OFF the output of the AC voltage standard.

Ending the range adjustment mode

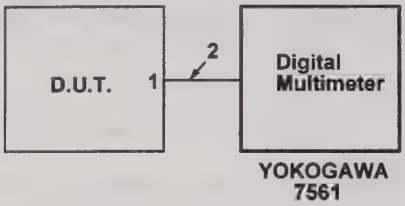
39 Pressing the SHIFT key then display D will appear "rAnGE" or "dA" or "Motor" or "End".
40 If you do adjustment of the D/A output, continue to the next section 4.3.
41 To end adjustment here, select "End" and press the ENTER key. Then display D will appear "CAL" or "tESt" or "Zero" or "End". Select "End" again, and press the ENTER key to return to the normal measurement mode.

4.3 D/A Output Adjustment (When install the option /DA)

• Introduction

The 2536 have outputs for 14 channels and adjustment is made from channel 1 to channel 14 in sequential order. However, only the specified channel can be adjusted.

• Connection



1 External input/oputput connector
2 36 pin connector to banana cable

Pin assignment of the external I/O connector

Pin No.	Signal Name	Pin No.	Signal Name
10	D/A GND	28	D/A GND
11	D/A GND	29	D/A GND
12	D/A CH1	30	D/A CH2
13	D/A CH3	31	D/A CH4
14	D/A CH5	32	D/A CH6
15	D/A CH7	33	D/A CH8
16	D/A CH9	34	D/A CH10
17	D/A CH11	35	D/A CH12
18	D/A CH13	36	D/A CH14

Figure 4.2 Connection for D/A output adjustment

• Procedure

Entering the adjustment mode

1 When display D showing "rAnGE" or "dA" or "Motor" or "End". Select "dA" using the cursor-key-key and press the ENTER-key. So that enter the D/A Output adjustment mode.

D/A Output adjustment

2 Connect according to the figure 4.2.
3 The D.U.T. automatically outputs +5V. When the value shown on the DMM becomes stabilized, adjust the value shown on display D same as the DMM value using the cursor-key. Then press the ENTER key.
4 Continuously, -5V will be output. Execute as described in step 3 again.
5 Repeat this work about channel 2 to channel 14.

Ending the adjustment mode

6 When you finished with channel 14, display D will appear "rAnGE" or "dA" or "Motor" or "End". Select "End" and press the ENTER key.
7 If you do range adjustment for motor evaluation, continue to the next section 4.4.
8 To end adjustment here, select "EnD" and press the ENTER key. Then display D will appear "CAL" or "tESt" or "Zero" or "End". Select "EnD" again, and press the ENTER key to return to the normal measurement mode.

4.4 Range Adjustment for Motor Evaluation (When the Model 253640)

• Connection

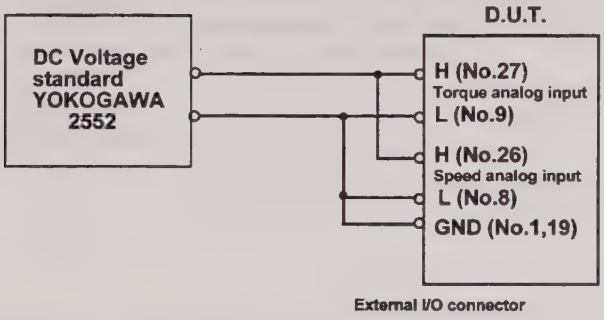


Figure 4.3 Connection for motor evaluation range adjustment

• Procedure

Entering the adjustment mode

1 When display D showing "rAnGE" or "dA" or "Motor" or "End". Select "Motor" using the cursor-key and press the ENTER-key. So that entering the motor evaluation range adjustment mode.

Motor evaluation range adjustment

2 Connect according to the figure 4.3.
3 The D.U.T. enters the 10V range adjustment mode automatically and "10.000" is displayed on display B.
4 Apply +10dcusing the DC standard.
5 When the value shown on display C, D becomes stabilized, press the ENTER key.

6 Apply -10dcusing the DC standard.
7 When the value shown on display C, D becomes stabilized, press the ENTER key.

Ending the adjustment mode and finished the all item adjustments

8 Display D will appear "rAnGE" or "dA" or "Motor" or "End". Select "End" and press the ENTER key.
9 Then display D will appear "CAL" or "tESt" or "Zero" or "End". Select "End" again, and press the ENTER key to return to the normal measurement mode.

Chapter 5 TROUBLE-SHOOTING

This chapter describes how to find causes for defects and how to find a defective assembly using the trouble-shooting flow chart starting from a faulty phenomenon. This chapter consists of the following sections.

5.1 Procedure
5.2 Flow Chart

5.1 Procedure

1 Recognizing the trouble.
First of all, make sure what kind of trouble it is and check whether there is a possibility of recurrence.
2 Check if it is a handling mistake or not.
Check whether the decision coincides with the error message (refer to section 2.2.3).
3 Execute self diagnosis.
Execute self diagnosis function by turning the power ON and find the problem items.
4 Analyze the cause of the problem according to the trouble-shooting flow chart.

WARNING

When performing service activities on the equipment body, separate all power sources from the equipment body before removing the cover.
• Disconnect the power cables.
• Turn the power switch off.
• Disconnect the input / output cables.
When the cover is removed, make sure not to touch high voltage areas.
Service screwdrivers should be made of insulating materials except for their tips.
The user for safety reasons should not perform any operations, which are not described in this manual.

5.2 *Flow Chart*

This flow chart consists of general service operations when a fault occurs.
This chart is not always suitable for various faults. However, it is recommended to perform operations according to the flow chart.

Figure 5.1 Flow Chart 1 of 5

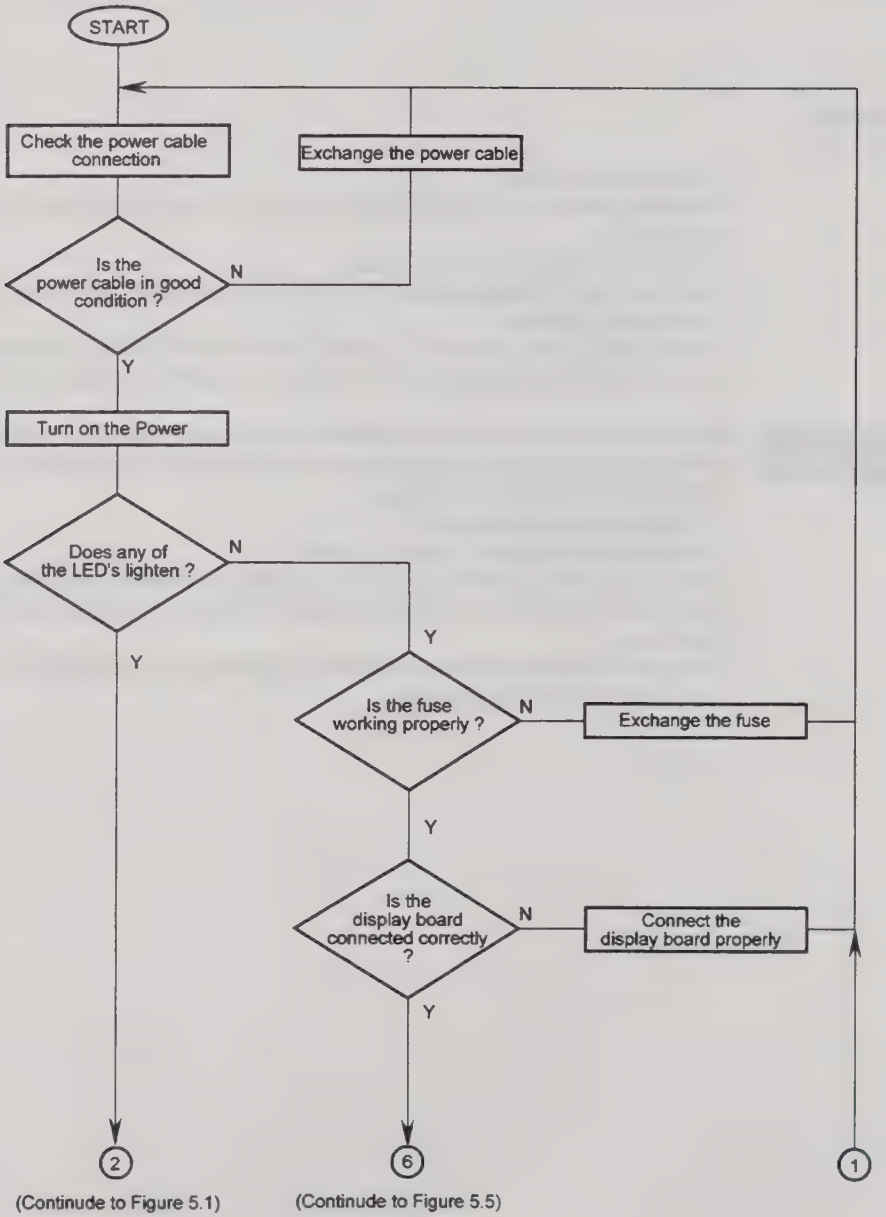


Figure 5.2 Flow Chart 2 of 5

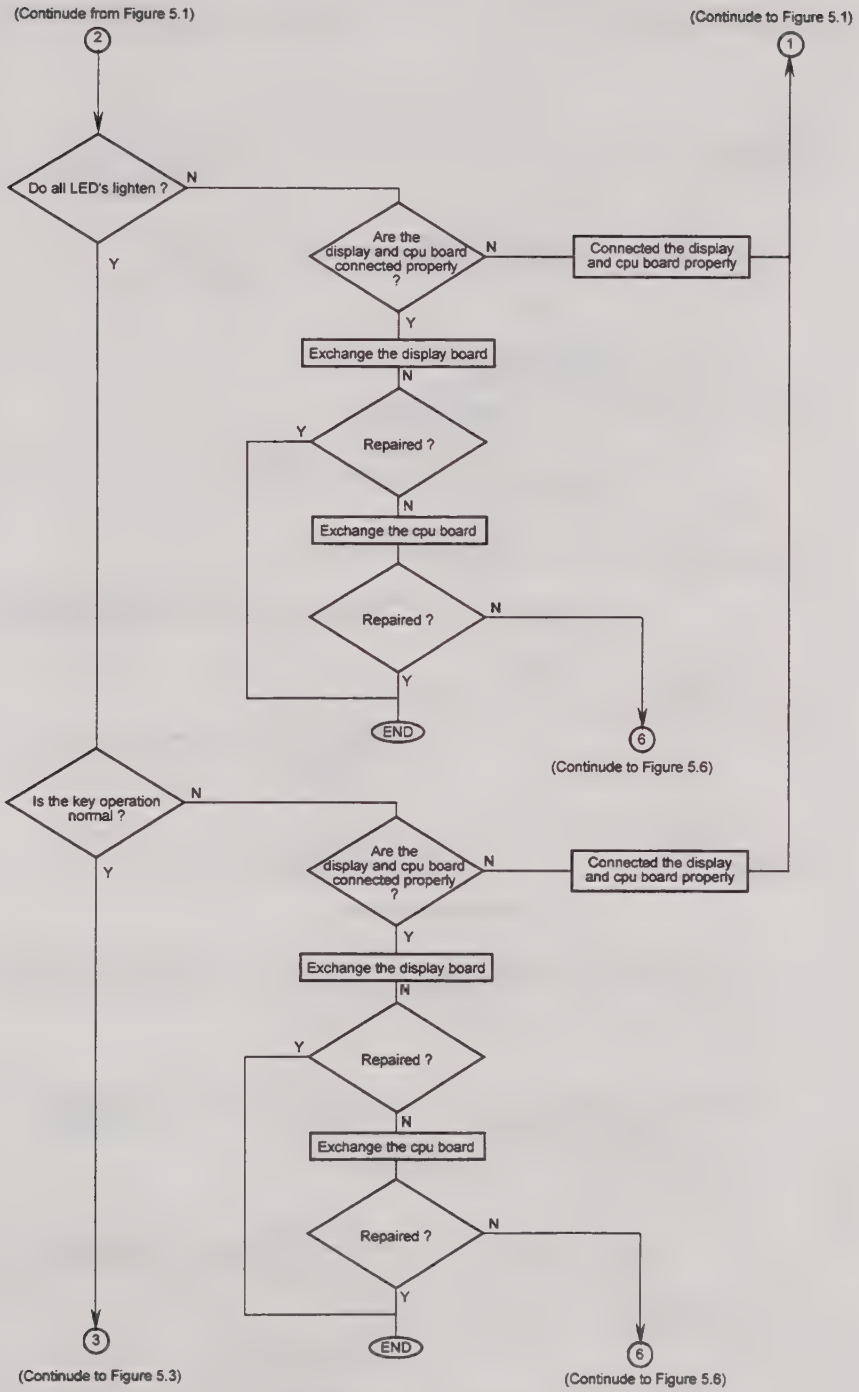


Figure 5.3 Flow Chart 3 of 5

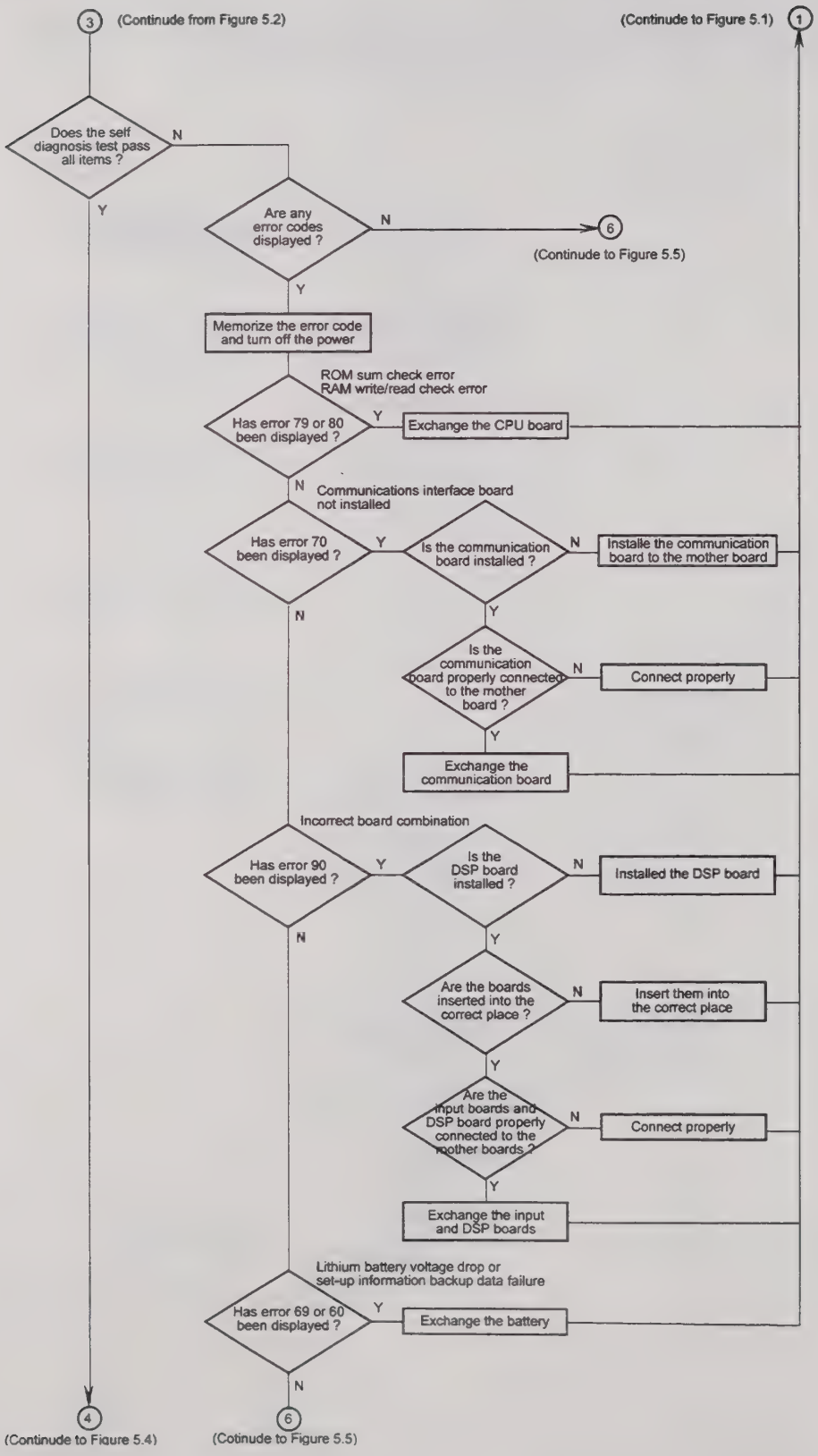


Figure 5.4 Flow Chart 4 of 5

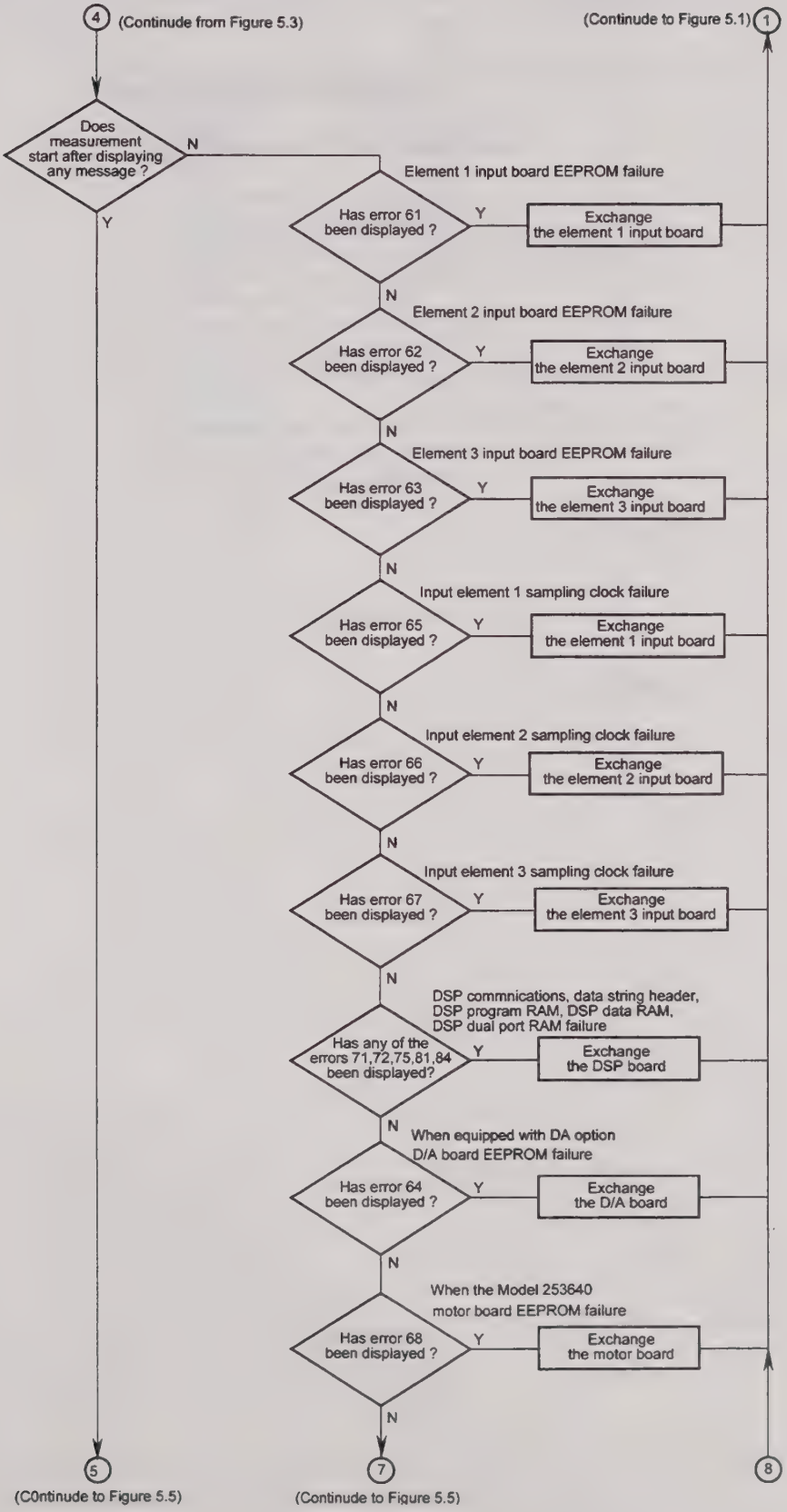
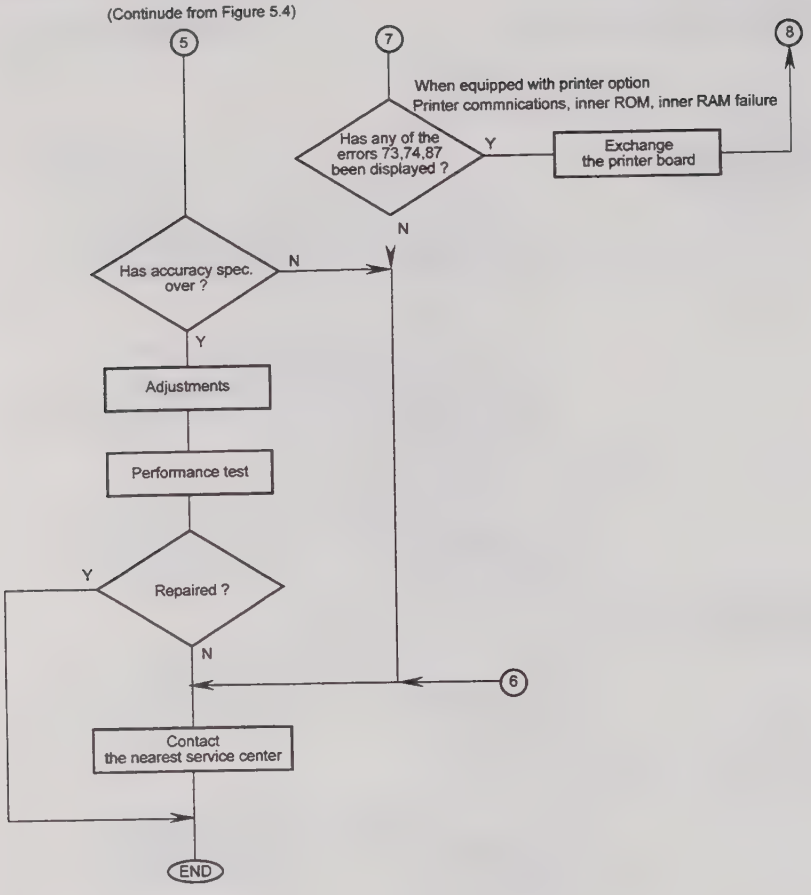


Figure 5.5 Flow Chart 5 of 5



Chapter 6 ENGINEERING DRAWINGS

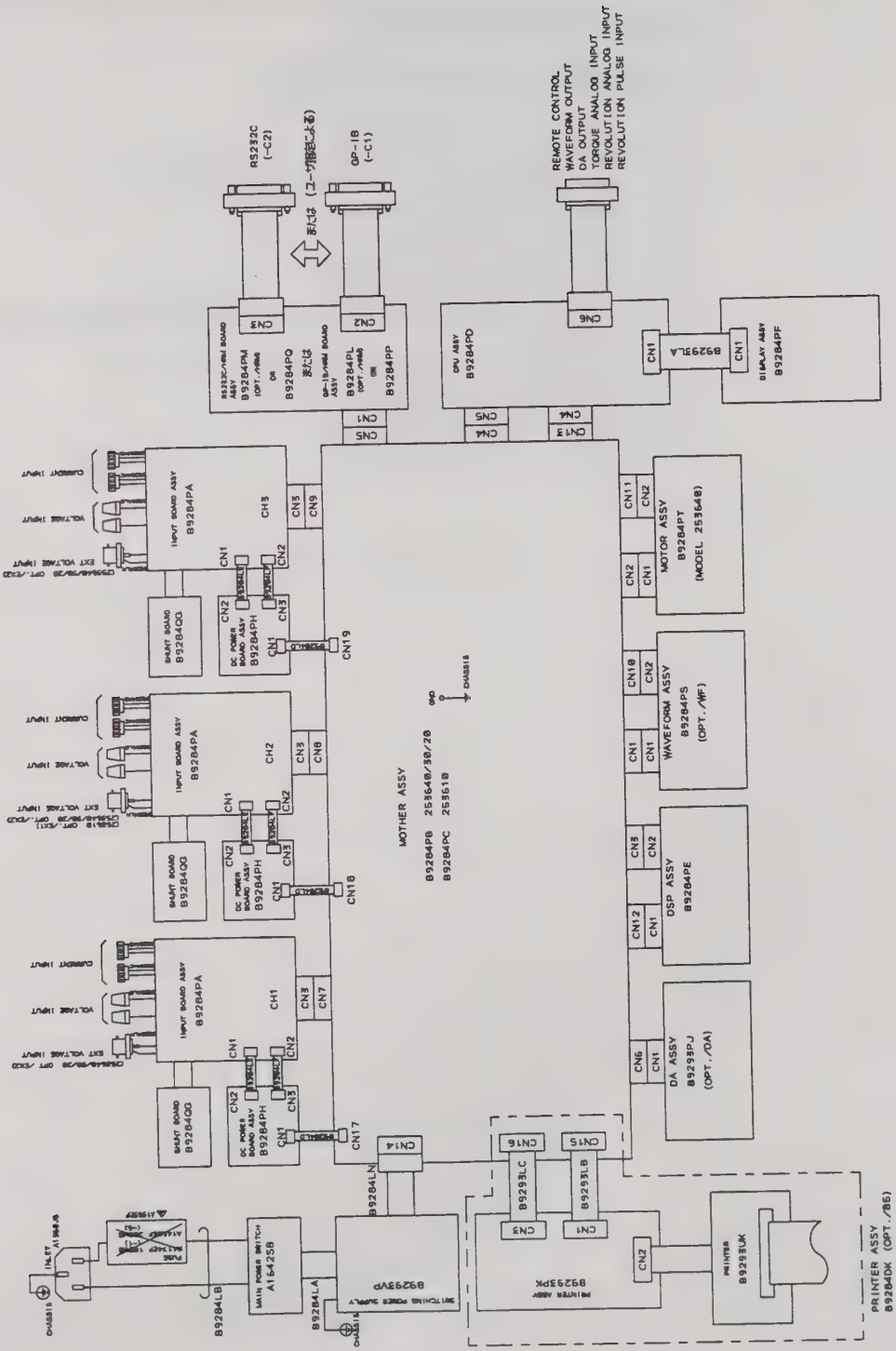
This chapter shows the schematic diagrams of the PCB circuits, the location of its components and list of electrical parts.

This chapter consists of the following sections.

6.1 Allover the this model (B9284GA)
6.2 Input Board Assembly (B9284PA)
6.3 Mother Board Assembly (B9284PB, B9284PC)
6.4 CPU Board Assembly (B9284PD)
6.5 DSP Assembly (B9284PE)
6.6 Display Board Assembly (B9284PF)
6.7 DC Power Assembly (B9284PH)
6.8 GP-IB/RS-232-C/HRM Board Assembly (B9284PL, B9284PM, B9284PP, B9284PQ)
6.9 Waveform Board Assembly (B9284PS)
6.10 Motor Board Assembly (B9284PT)
6.11 DA Board Assembly (B9293PJ)
6.12 Printer Board Assembly (B9293PK)

6.1 Allover the this model (B9284GA)

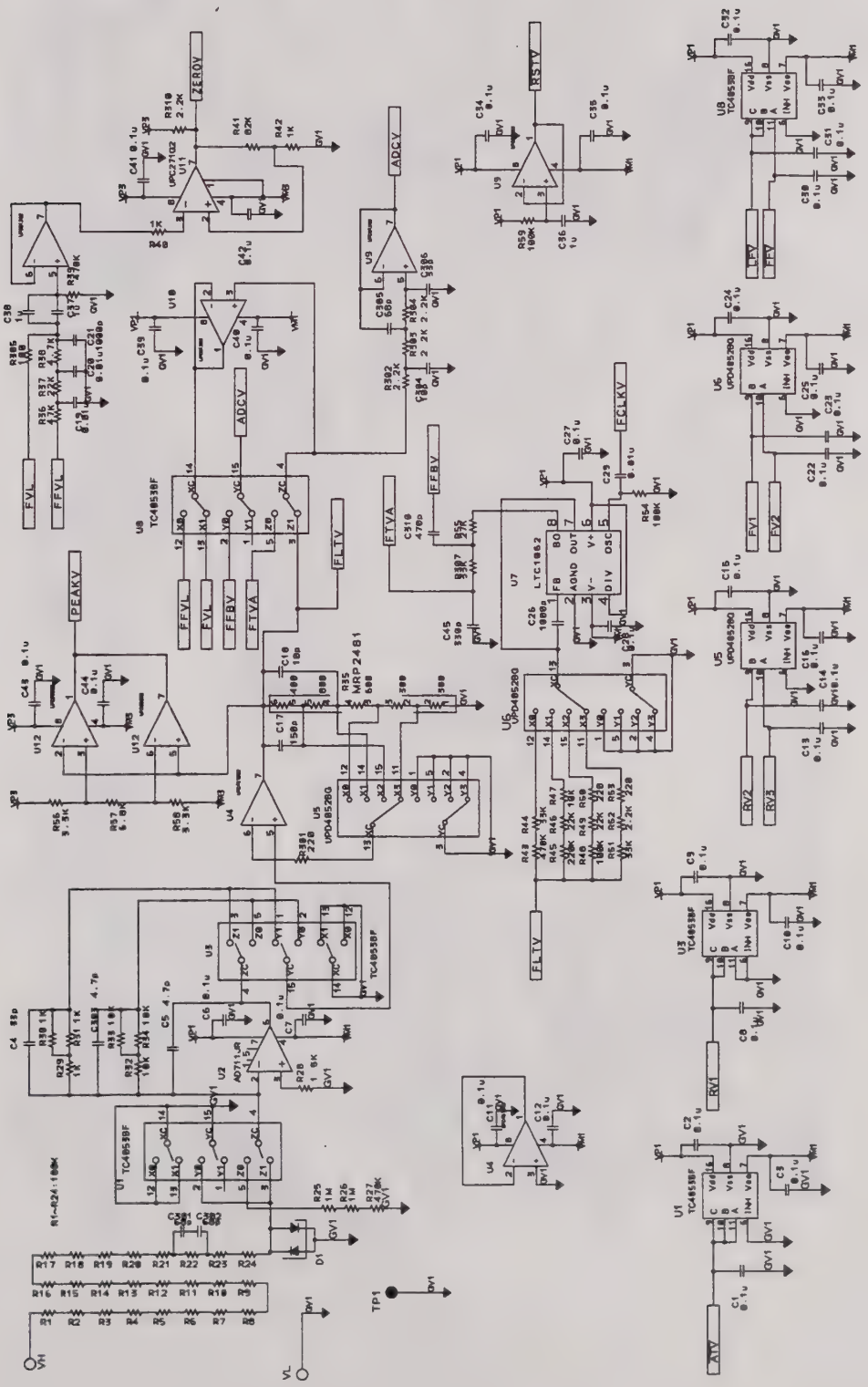
Schematic Diagram

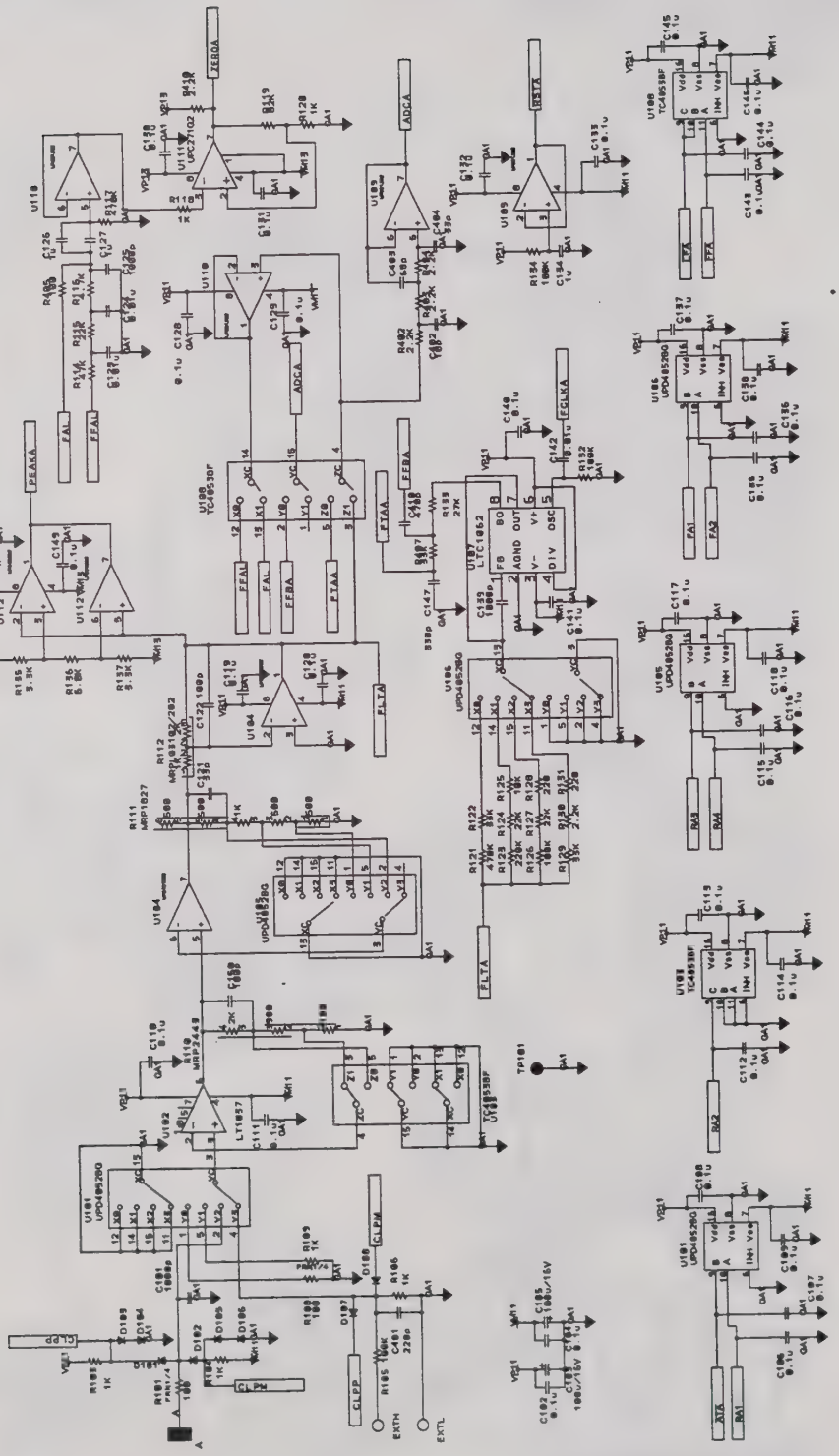


6.2 Input Board Assembly (B9284PA)

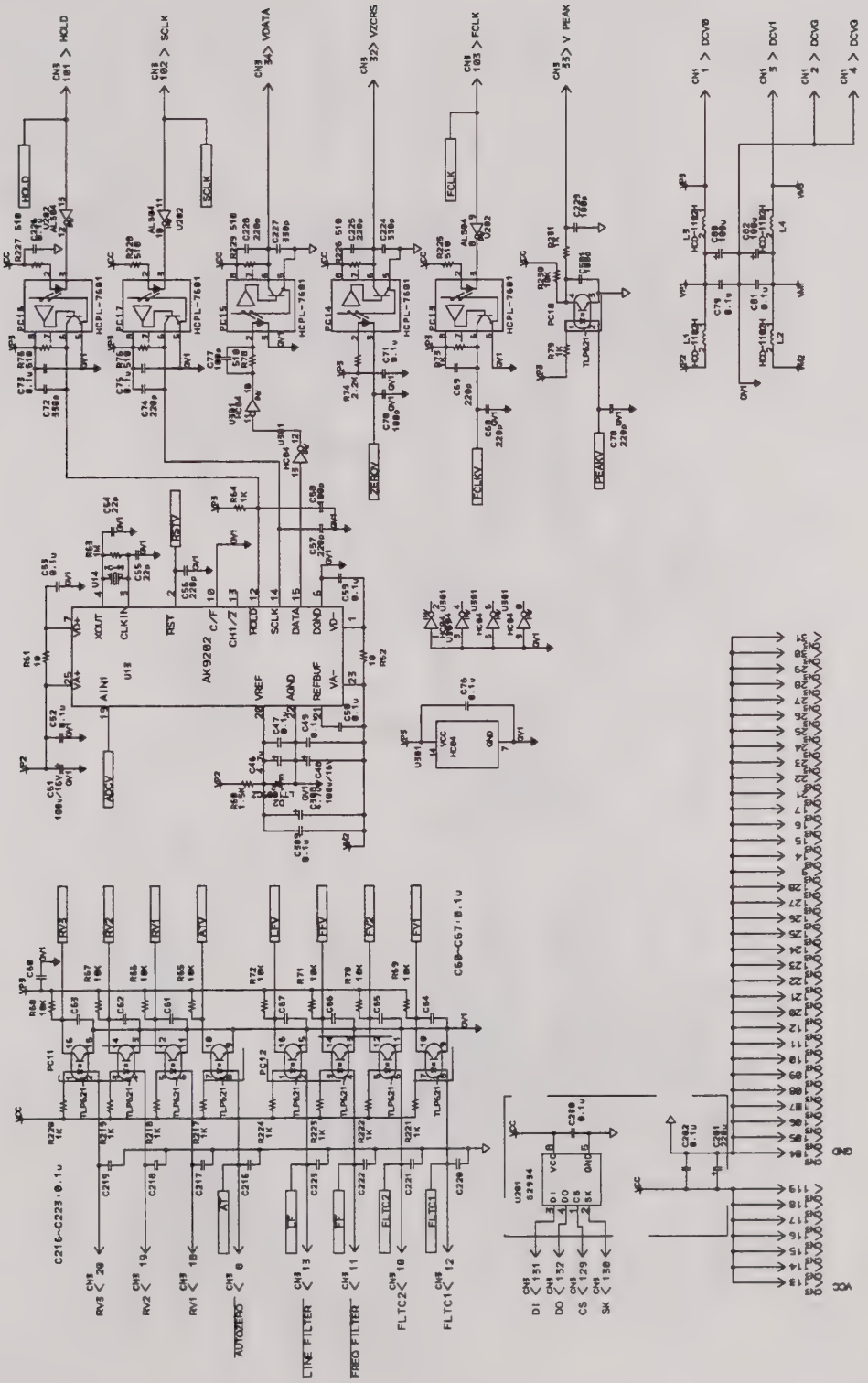
6.2.1 Schematic Diagrams (B9284PA)

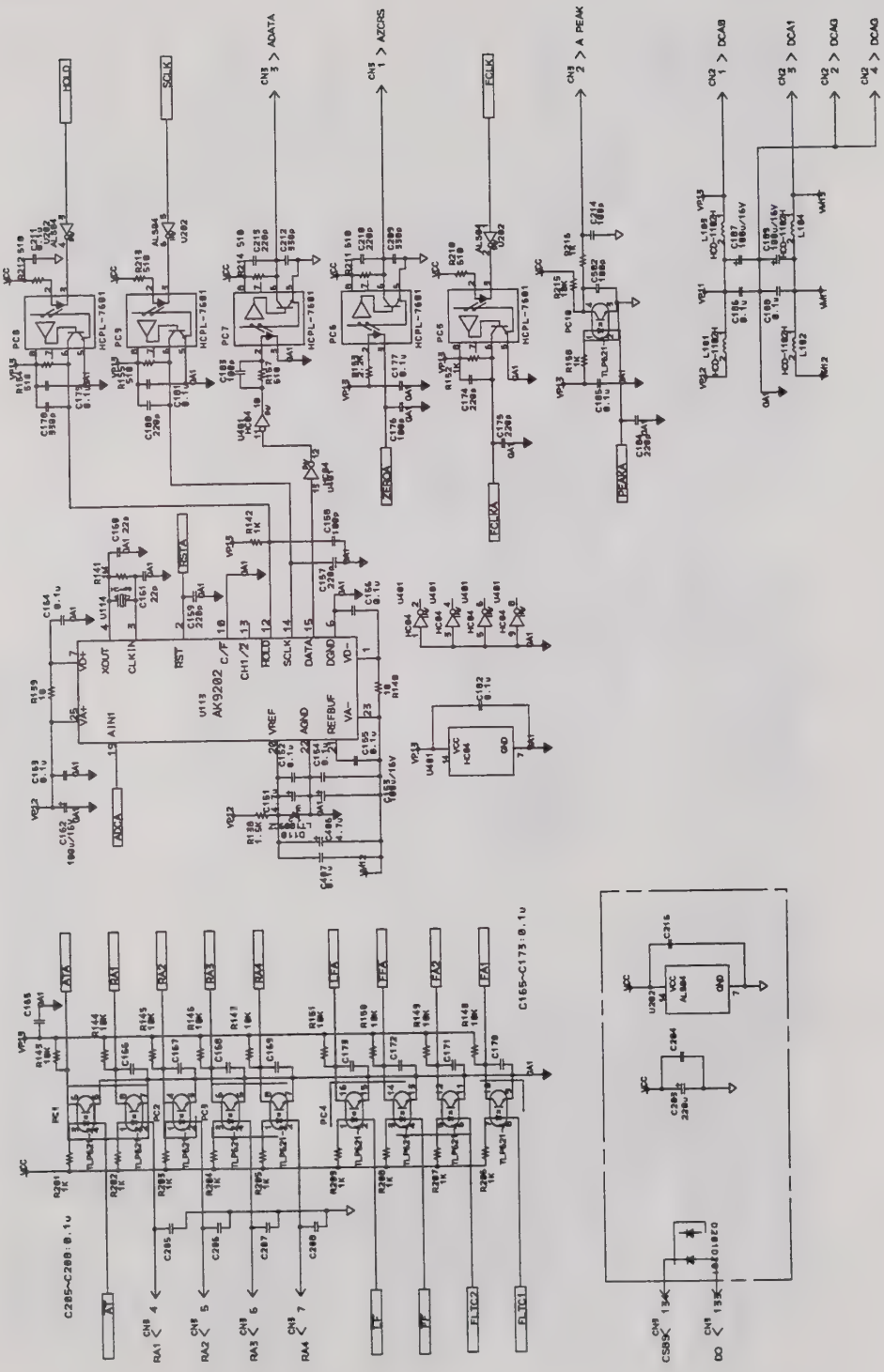
Page 1 of 4





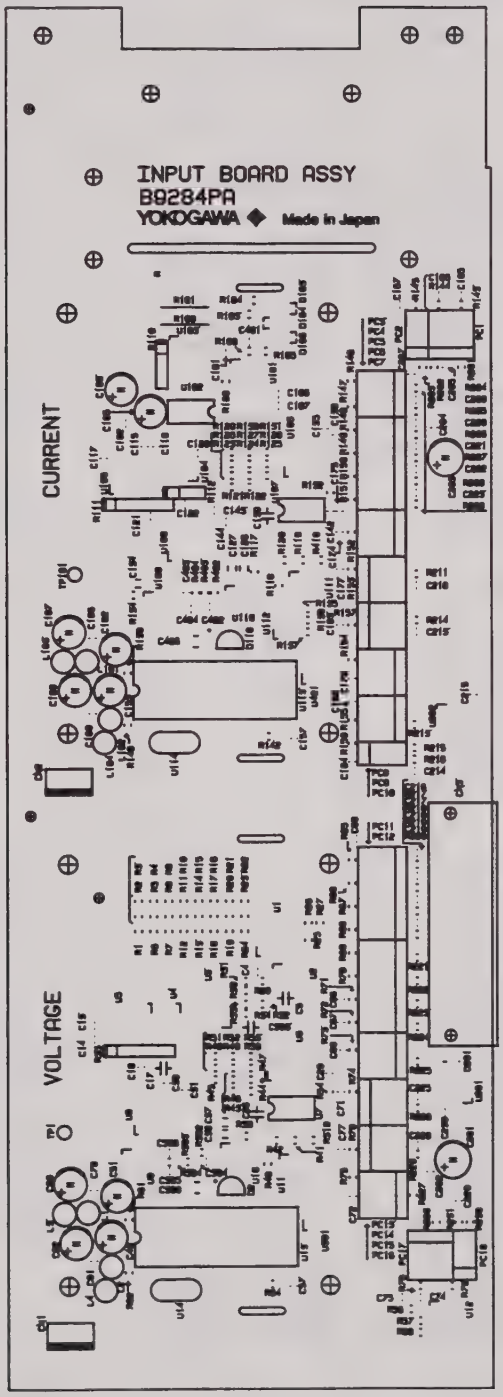
Page 3 of 4



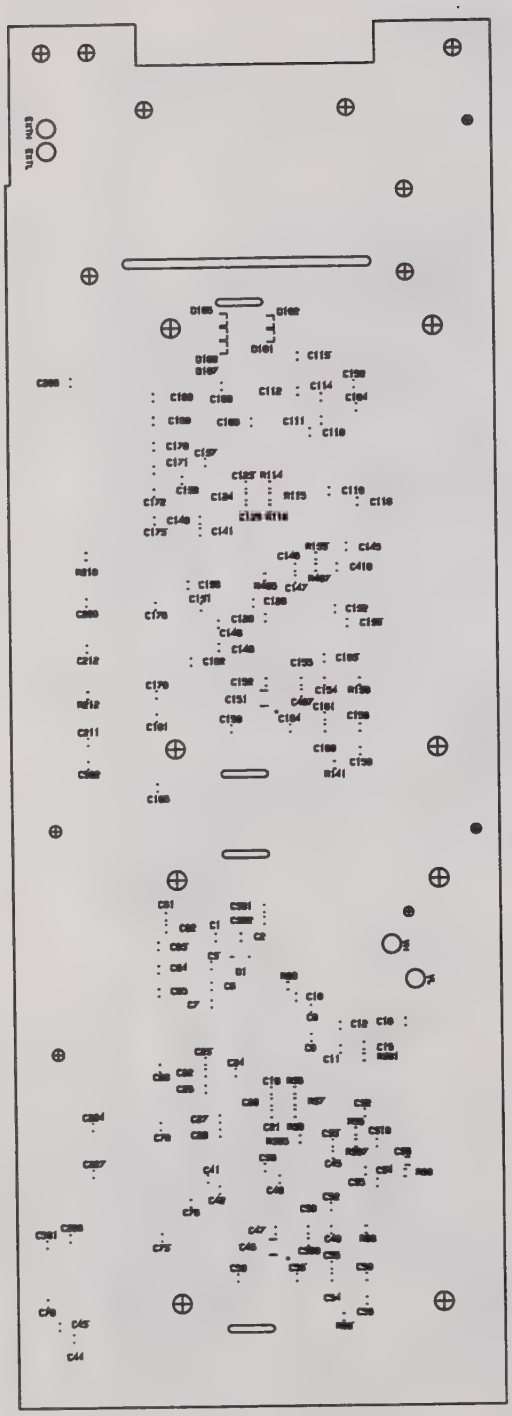


6.2.2 Location of Components (B9284PA)

Parts mounting side



Soldering side



6.2.3 List of Electrical Parts (B9284PA)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	INPUT SMC ASSY		B9284RA	YOKOGAWA
C103	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C105	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C139	1	FILM CAP	0.001 μF ±1% 50V	ECQ-P1H102FZ	MATSUSITA1
C153	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C162	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C17	1	MICA CAP	150pF ±10% 100V	DM05C151K1	SOSHIN
C187	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C189	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C201	1	ALMINUM CAP	180 μF ±20% 10V	SXE10VB-180	NITSUCHEMI
C203	1	ALMINUM CAP	180 μF ±20% 10V	SXE10VB-180	NITSUCHEMI
C26	1	FILM CAP	0.001 μF ±1% 50V	ECQ-P1H102FZ	MATSUSITA1
C303	1	MICA CAP	4.7pF ±10% 100V	DM05C4R7K1	NITSUKO
C48	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C5	1	MICA CAP	4.7pF ±10% 100V	DM05C4R7K1	NITSUKO
C51	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C80	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C82	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
CN1	1	POST TYPE CONN		5045-04A	MOLEX
CN2	1	POST TYPE CONN		5045-04A	MOLEX
CN3	1	POST TYPE CONN		FX2-68P-1.27DSL	HIROSE
D110	1	VOLTAGE RGLTR		LT1009CZ	LINEARTECH
D2	1	VOLTAGE RGLTR		LT1009CZ	LINEARTECH
L1	1	COIL		HCD-1681H	HOKKOU ELE
L101	1	COIL		HCD-1681H	HOKKOU ELE
L102	1	COIL		HCD-1681H	HOKKOU ELE
L103	1	COIL		HCD-1681H	HOKKOU ELE
L104	1	COIL		HCD-1681H	HOKKOU ELE
L2	1	COIL		HCD-1681H	HOKKOU ELE
L3	1	COIL		HCD-1681H	HOKKOU ELE
L4	1	COIL		HCD-1681H	HOKKOU ELE
PC1	1	OPTO ISOLATOR		TLP621-2	TOSHIBA
PC10	1	OPTO ISOLATOR		TLP621(BL-D4)	TOSHIBA
PC11	1	OPTO ISOLATOR		TLP621-4(D4-GB)	TOSHIBA
PC12	1	OPTO ISOLATOR		TLP621-4(D4-GB)	TOSHIBA
PC13	1	OPTO ISOLATOR		HCPL-7601	HP
PC14	1	OPTO ISOLATOR		HCPL-7601	HP
PC15	1	OPTO ISOLATOR		HCPL-7601	HP
PC16	1	OPTO ISOLATOR		HCPL-7601	HP
PC17	1	OPTO ISOLATOR		HCPL-7601	HP
PC18	1	OPTO ISOLATOR		TLP621(BL-D4)	TOSHIBA
PC2	1	OPTO ISOLATOR		TLP621(BL-D4)	TOSHIBA
PC3	1	OPTO ISOLATOR		TLP621-2	TOSHIBA
PC4	1	OPTO ISOLATOR		TLP621-4(D4-GB)	TOSHIBA
PC5	1	OPTO ISOLATOR		HCPL-7601	HP
PC6	1	OPTO ISOLATOR		HCPL-7601	HP
PC7	1	OPTO ISOLATOR		HCPL-7601	HP
PC8	1	OPTO ISOLATOR		HCPL-7601	HP
PC9	1	OPTO ISOLATOR		HCPL-7601	HP
R110	1	RES MODULE	3* MG 0.3W	MRP2443	TAMA
R111	1	RES MODULE	5* MF 0.5W	MRP1827	TAMA
R112	1	RES MODULE	2* MF 200mW	MRPL03102/202BAT1B	TAMA
R35	1	RES MODULE	5* MG 0.5W	MRP2481	TAMA
TP1	1	POST TYPE CONN		VTC-1-1	KSBECT
TP101	1	POST TYPE CONN		VTC-1-1	KSBECT
U102	1	AMPLIFIER IC		LT1037CN8	LINEARTECH
U107	1	OTHER ANALOG IC		LTC1062CN8 LI	LINEARTECH
U113	1	A/D & D/A		AK9202-VP	ASAHIKASEI
U114	1	CRYSTAL UNIT		HC-49/U 8000KHZ	KINSEKI
U13	1	A/D & D/A		AK9202-VP	ASAHIKASEI
U14	1	CRYSTAL UNIT		HC-49/U 8000KHZ	KINSEKI
U7	1	OTHER ANALOG IC		LTC1062CN8 LI	LINEARTECH

List of Electrical Parts (B9284RA)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	INPUT PWB		B9284QA	YOKOGAWA
C1	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C10	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C101	1	CERAMIC CAP	1000pF ±5% 50V	ECU-*1H102JCX	MATSUSHITA
C102	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C104	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C106	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C107	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C108	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C109	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C11	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C110	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C111	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C112	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C113	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C114	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C115	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C116	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C117	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C118	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C119	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C12	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C120	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C121	1	CERAMIC CAP	33pF ±5% 50V	C2012CH1H330J*	TDK
C122	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C123	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C124	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C125	1	CERAMIC CAP	1000pF ±5% 50V	ECU-*1H102JCX	MATSUSHITA
C126	1	CERAMIC CAP	1μF-20~80% 16V	C13Y5V1C105ZP*	TOKIN
C127	1	CERAMIC CAP	1μF-20~80% 16V	C13Y5V1C105ZP*	TOKIN
C128	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C129	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C13	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C130	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C131	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C132	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C133	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C134	1	CERAMIC CAP	1μF-20~80% 16V	C13Y5V1C105ZP*	TOKIN
C135	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C136	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C137	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C138	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C14	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C140	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C141	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C142	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C143	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C144	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C145	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C146	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C147	1	CERAMIC CAP	330pF ±5% 50V	C2012CH1H331J*	TDK
C148	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C149	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C15	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C150	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C151	1	TANTALUM CAP	4.7μF ±20% 16V	267M1602475M*	MATSUO
C152	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C154	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C155	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C156	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C157	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C158	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C159	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C16	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK

List of Electrical Parts (B9284RA) Continued

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
C160	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C163	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C164	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C165	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C166	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C167	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C168	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C169	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C170	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C171	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C172	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C173	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C174	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C175	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C176	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C177	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C178	1	CERAMIC CAP	330pF ±5% 50V	C2012CH1H331J*	TDK
C179	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C18	1	CERAMIC CAP	10pF ±1P% 50V	C2012CH1H100F*	TDK
C180	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C181	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C182	1		0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C183	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C184	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C185	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C186	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C188	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C19	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C2	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C20	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C202	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C204	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C205	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C206	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C207	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C208	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C209	1	CERAMIC CAP	330pF ±5% 50V	C2012CH1H331J*	TDK
C21	1	CERAMIC CAP	1000pF ±5% 50V	ECU-*1H102JCX	MATSUSHITA
C210	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C211	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C212	1	CERAMIC CAP	330pF ±5% 50V	C2012CH1H331J*	TDK
C213	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C214	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C215	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C216	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C217	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C218	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C219	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C22	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C220	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C221	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C222	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C223	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C224	1	CERAMIC CAP	330pF ±5% 50V	C2012CH1H331J*	TDK
C225	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C226	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C227	1	CERAMIC CAP	330pF ±5% 50V	C2012CH1H331J*	TDK
C228	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C229	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C23	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C230	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C24	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C25	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C27	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C28	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK

List of Electrical Parts (B9284RA) Continued

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
C29	1	CERAMIC CAP	0.01 μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C3	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C30	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C301	1	CERAMIC CAP	68pF ±5% 50V	C2102CH1H680J*	TDK
C302	1	CERAMIC CAP	68pF ±5% 50V	C2102CH1H680J*	TDK
C304	1	CERAMIC CAP	10pF ±1P% 50V	C2012CH1H100F*	TDK
C305	1	CERAMIC CAP	68pF ±5% 50V	C2102CH1H680J*	TDK
C306	1	CERAMIC CAP	33pF ±5% 50V	C2012CH1H330J*	TDK
C308	1	TANTALUM CAP	4.7 μF ±20% 16V	267M1602475M*	MATSUO
C309	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C31	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C310	1	CERAMIC CAP	470pF ±5% 50V	C2012CH1H471J*	TDK
C32	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C33	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C34	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C35	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C36	1	CERAMIC CAP	1 μF-20~80% 16V	C13Y5V1C105ZP*	TOKIN
C37	1	CERAMIC CAP	1 μF-20~80% 16V	C13Y5V1C105ZP*	TOKIN
C38	1	CERAMIC CAP	1 μF-20~80% 16V	C13Y5V1C105ZP*	TOKIN
C39	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C4	1	CERAMIC CAP	33pF ±5% 50V	C2012CH1H330J*	TDK
C40	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C401	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C402	1	CERAMIC CAP	10pF ±1P% 50V	C2012CH1H100F*	TDK
C403	1	CERAMIC CAP	68pF ±5% 50V	C2102CH1H680J*	TDK
C404	1	CERAMIC CAP	33pF ±5% 50V	C2012CH1H330J*	TDK
C406	1	TANTALUM CAP	4.7 μF ±20% 16V	267M1602475M*	MATSUO
C407	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C41	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C410	1	CERAMIC CAP	470pF ±5% 50V	C2012CH1H471J*	TDK
C42	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C43	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C44	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C45	1	CERAMIC CAP	330pF ±5% 50V	C2012CH1H331J*	TDK
C46	1	TANTALUM CAP	4.7 μF ±20% 16V	267M1602475M*	MATSUO
C47	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C49	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C50	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C501	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C502	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C52	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C53	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C54	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C55	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C56	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C57	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C58	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C59	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C6	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C60	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C61	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C62	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C63	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C64	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C65	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C66	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C67	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C68	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C69	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C7	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C70	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C71	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C72	1	CERAMIC CAP	330pF ±5% 50V	C2012CH1H331J*	TDK
C73	1	CER CAPACITOR	0.1 μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C74	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK

List of Electrical Parts (B9284RA) Continued

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
C75	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C77	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C78	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C79	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C8	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C81	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C9	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
D1	1	DIODE		MA159A	MATSUSHITA
D101	1	DIODE		SFPM-64	SANKEN
D102	1	DIODE		SFPM-64	SANKEN
D103	1	DIODE		SFPM-64	SANKEN
D104	1	DIODE		SFPM-64	SANKEN
D105	1	DIODE		SFPM-64	SANKEN
D106	1	DIODE		SFPM-64	SANKEN
D107	1	DIODE		SFPM-64	SANKEN
D108	1	DIODE		SFPM-64	SANKEN
D201	1	DIODE		MA159A	MATSUSHITA
R1	1	PRECISION RES	100kΩ ±0.5% 0.1W	RN73F2A100K D	KOA
R10	1	PRECISION RES	100kΩ ±0.5% 0.1W	RN73F2A100K D	KOA
R103	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R104	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R105	1	PRECISION RES	100kΩ ±0.5% 0.1W	RN73F2A100K D	KOA
R106	1	PRECISION RES	1kΩ ±0.5% 0.1W	RN73F2A1K D	KOA
R109	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R11	1	PRECISION RES	100kΩ ±0.5% 0.1W	RN73F2A100K D	KOA
R114	1	METAL OXIDE RES	47kΩ ±1% 0.1W	ERJ6ENF4702*	MATSUSHITA
R115	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R116	1	METAL OXIDE RES	4.7kΩ ±1% 0.1W	ERJ6ENF4701*	MATSUSHITA
R117	1	METAL OXIDE RES	470kΩ ±1% 0.1W	ERJ6ENF4703*	MATSUSHITA
R118	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R119	1	METAL OXIDE RES	82kΩ ±1% 0.1W	ERJ6ENF8202*	MATSUSHITA
R12	1	PRECISION RES	100kΩ ±0.5% 0.1W	RN73F2A100K D	KOA
R120	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R121	1	METAL OXIDE RES	470kΩ ±1% 0.1W	ERJ6ENF4703*	MATSUSHITA
R122	1	METAL OXIDE RES	33kΩ ±1% 0.1W	ERJ6ENF3302*	MATSUSHITA
R123	1	METAL OXIDE RES	220kΩ ±1% 0.1W	ERJ6ENF2203*	MATSUSHITA
R124	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R125	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R126	1	METAL OXIDE RES	100kΩ ±1% 0.1W	ERJ6ENF1003*	MATSUSHITA
R127	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R128	1	METAL OXIDE RES	220Ω ±1% 0.1W	ERJ6ENF2200*	MATSUSHITA
R129	1	METAL OXIDE RES	33kΩ ±1% 0.1W	ERJ6ENF3302*	MATSUSHITA
R13	1	PRECISION RES	100kΩ ±0.5% 0.1W	RN73F2A100K D	KOA
R130	1	METAL OXIDE RES	2.2kΩ ±1% 0.1W	ERJ6ENF2201*	MATSUSHITA
R131	1	METAL OXIDE RES	220Ω ±1% 0.1W	ERJ6ENF2200*	MATSUSHITA
R132	1	METAL OXIDE RES	100kΩ ±1% 0.1W	ERJ6ENF1003*	MATSUSHITA
R133	1	METAL OXIDE RES	27kΩ ±1% 0.1W	ERJ6ENF2702*	MATSUSHITA
R134	1	METAL OXIDE RES	100kΩ ±1% 0.1W	ERJ6ENF1003*	MATSUSHITA
R135	1	METAL OXIDE RES	3.3kΩ ±1% 0.1W	ERJ6ENF3301*	MATSUSHITA
R136	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R137	1	METAL OXIDE RES	3.3kΩ ±1% 0.1W	ERJ6ENF3301*	MATSUSHITA
R138	1	METAL OXIDE RES	1.5kΩ ±1% 0.1W	ERJ6ENF1501*	MATSUSHITA
R139	1	METAL OXIDE RES	10Ω ±1% 0.1W	ERJ6ENF10R0*	MATSUSHITA
R14	1	PRECISION RES	100kΩ ±0.5% 0.1W	RN73F2A100K D	KOA
R140	1	METAL OXIDE RES	10Ω ±1% 0.1W	ERJ6ENF10R0*	MATSUSHITA
R141	1	METAL OXIDE RES	1MΩ ±1% 0.1W	ERJ6ENF1004*	MATSUSHITA
R142	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R143	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R144	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R145	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R146	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R147	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R148	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R149	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA

Item	Q'ty	Part Name	Description			MFR Part Name	MFR Name
R15	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R154	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R155	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R157	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R158	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R16	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R17	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R18	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R19	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R2	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R20	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R201	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R202	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R203	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R204	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R205	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R206	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R207	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R208	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R209	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R21	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R210	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R211	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R212	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R213	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R214	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R215	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R216	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R217	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R218	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R219	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R22	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R220	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R221	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R222	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R223	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R224	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R225	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R226	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R227	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R228	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R229	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R23	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R230	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R231	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R24	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R25	1	METAL OXIDE RES	1MΩ	±1%	0.1W	ERJ6ENF1004*	MATSUSHITA
R26	1	METAL OXIDE RES	1MΩ	±1%	0.1W	ERJ6ENF1004*	MATSUSHITA
R27	1	METAL OXIDE RES	470kΩ	±1%	0.1W	ERJ6ENF4703*	MATSUSHITA
R28	1	METAL OXIDE RES	1.5kΩ	±1%	0.1W	ERJ6ENF1501*	MATSUSHITA
R29	1	PRECISION RES	1kΩ	±0.5%	0.1W	RN73F2A1K D	KOA
R3	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R30	1	PRECISION RES	1kΩ	±0.5%	0.1W	RN73F2A1K D	KOA
R301	1	METAL OXIDE RES	220Ω	±1%	0.1W	ERJ6ENF2200*	MATSUSHITA
R302	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R303	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R304	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R305	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R307	1	METAL OXIDE RES	33kΩ	±1%	0.1W	ERJ6ENF3302*	MATSUSHITA
R31	1	PRECISION RES	1kΩ	±0.5%	0.1W	RN73F2A1K D	KOA
R310	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R32	1	PRECISION RES	10kΩ	±0.5%	0.1W	RN73F2A10K D	KOA
R33	1	PRECISION RES	10kΩ	±0.5%	0.1W	RN73F2A10K D	KOA
R34	1	PRECISION RES	10kΩ	±0.5%	0.1W	RN73F2A10K D	KOA
R36	1	METAL OXIDE RES	47kΩ	±1%	0.1W	ERJ6ENF4702*	MATSUSHITA

List of Electrical Parts (B9284RA) Continued

Item	Q'ty	Part Name	Description			MFR Part Name	MFR Name
R37	1	METAL OXIDE RES	22kΩ	±1%	0.1W	ERJ6ENF2202*	MATSUSHITA
R39	1	METAL OXIDE RES	470kΩ	±1%	0.1W	ERJ6ENF4703*	MATSUSHITA
R4	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R40	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R402	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R403	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R404	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R405	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R407	1	METAL OXIDE RES	33kΩ	±1%	0.1W	ERJ6ENF3302*	MATSUSHITA
R41	1	METAL OXIDE RES	82kΩ	±1%	0.1W	ERJ6ENF8202*	MATSUSHITA
R410	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R42	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R43	1	METAL OXIDE RES	470kΩ	±1%	0.1W	ERJ6ENF4703*	MATSUSHITA
R44	1	METAL OXIDE RES	33kΩ	±1%	0.1W	ERJ6ENF3302*	MATSUSHITA
R45	1	METAL OXIDE RES	220kΩ	±1%	0.1W	ERJ6ENF2203*	MATSUSHITA
R46	1	METAL OXIDE RES	22kΩ	±1%	0.1W	ERJ6ENF2202*	MATSUSHITA
R47	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R48	1	METAL OXIDE RES	100kΩ	±1%	0.1W	ERJ6ENF1003*	MATSUSHITA
R49	1	METAL OXIDE RES	22kΩ	±1%	0.1W	ERJ6ENF2202*	MATSUSHITA
R5	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R50	1	METAL OXIDE RES	220Ω	±1%	0.1W	ERJ6ENF2200*	MATSUSHITA
R51	1	METAL OXIDE RES	33kΩ	±1%	0.1W	ERJ6ENF3302*	MATSUSHITA
R52	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R53	1	METAL OXIDE RES	220Ω	±1%	0.1W	ERJ6ENF2200*	MATSUSHITA
R54	1	METAL OXIDE RES	100kΩ	±1%	0.1W	ERJ6ENF1003*	MATSUSHITA
R55	1	METAL OXIDE RES	27kΩ	±1%	0.1W	ERJ6ENF2702*	MATSUSHITA
R56	1	METAL OXIDE RES	3.3kΩ	±1%	0.1W	ERJ6ENF3301*	MATSUSHITA
R57	1	METAL OXIDE RES	6.8kΩ	±1%	0.1W	ERJ6ENF6801*	MATSUSHITA
R58	1	METAL OXIDE RES	3.3kΩ	±1%	0.1W	ERJ6ENF3301*	MATSUSHITA
R59	1	METAL OXIDE RES	100kΩ	±1%	0.1W	ERJ6ENF1003*	MATSUSHITA
R6	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R60	1	METAL OXIDE RES	1.5kΩ	±1%	0.1W	ERJ6ENF1501*	MATSUSHITA
R61	1	METAL OXIDE RES	10Ω	±1%	0.1W	ERJ6ENF10R0*	MATSUSHITA
R62	1	METAL OXIDE RES	10Ω	±1%	0.1W	ERJ6ENF10R0*	MATSUSHITA
R63	1	METAL OXIDE RES	1MΩ	±1%	0.1W	ERJ6ENF1004*	MATSUSHITA
R64	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R65	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R66	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R67	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R68	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R69	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R7	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R70	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R71	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R72	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R73	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R74	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R75	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R76	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R78	1	METAL OXIDE RES	510Ω	±1%	0.1W	ERJ6ENF5100*	MATSUSHITA
R79	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R8	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
R9	1	PRECISION RES	100kΩ	±0.5%	0.1W	RN73F2A100K D	KOA
U1	1	CMOS LOGIC				TC4053BF	TOSHIBA
U10	1	AMPLIFIER IC				UPC812G2	NEC
U101	1	ANALOG SWITCH				UPD4052BG	NEC
U103	1	CMOS LOGIC				TC4053BF	TOSHIBA
U104	1	AMPLIFIER IC				UPC4572G2	NEC
U105	1	ANALOG SWITCH				UPD4052BG	NEC
U106	1	ANALOG SWITCH				UPD4052BG	NEC
U108	1	CMOS LOGIC				TC4053BF	TOSHIBA
U109	1	AMPLIFIER IC				UPC812G2	NEC
U11	1	COMPARATOR IC				UPC271G2	NEC
U110	1	AMPLIFIER IC				UPC812G2	NEC
U111	1	COMPARATOR IC				UPC271G2	NEC

List of Electrical Parts (B9284RA) Continued

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
U112	1	COMPARATOR IC		UPC393G2	NEC
U202	1	TTL		SN74ALS04BNS	TI
U3	1	CMOS LOGIC		TC4053BF	TOSHIBA
U301	1	CMOS LOGIC		TC74HC04AF	TOSHIBA
U4	1	AMPLIFIER IC		UPC4572G2	NEC
U401	1	CMOS LOGIC		TC74HC04AF	TOSHIBA
U5	1	ANALOG SWITCH		UPD4052BG	NEC
U6	1	ANALOG SWITCH		UPD4052BG	NEC
U8	1	CMOS LOGIC		TC4053BF	TOSHIBA
U9	1	AMPLIFIER IC		UPC812G2	NEC

6.3 Mother Board Assembly (B9284PB, B9284PC)

B9284PB for Model 253620,253630,253640
B9284PC for Model 253610

6.3.1 Schematic Diagrams

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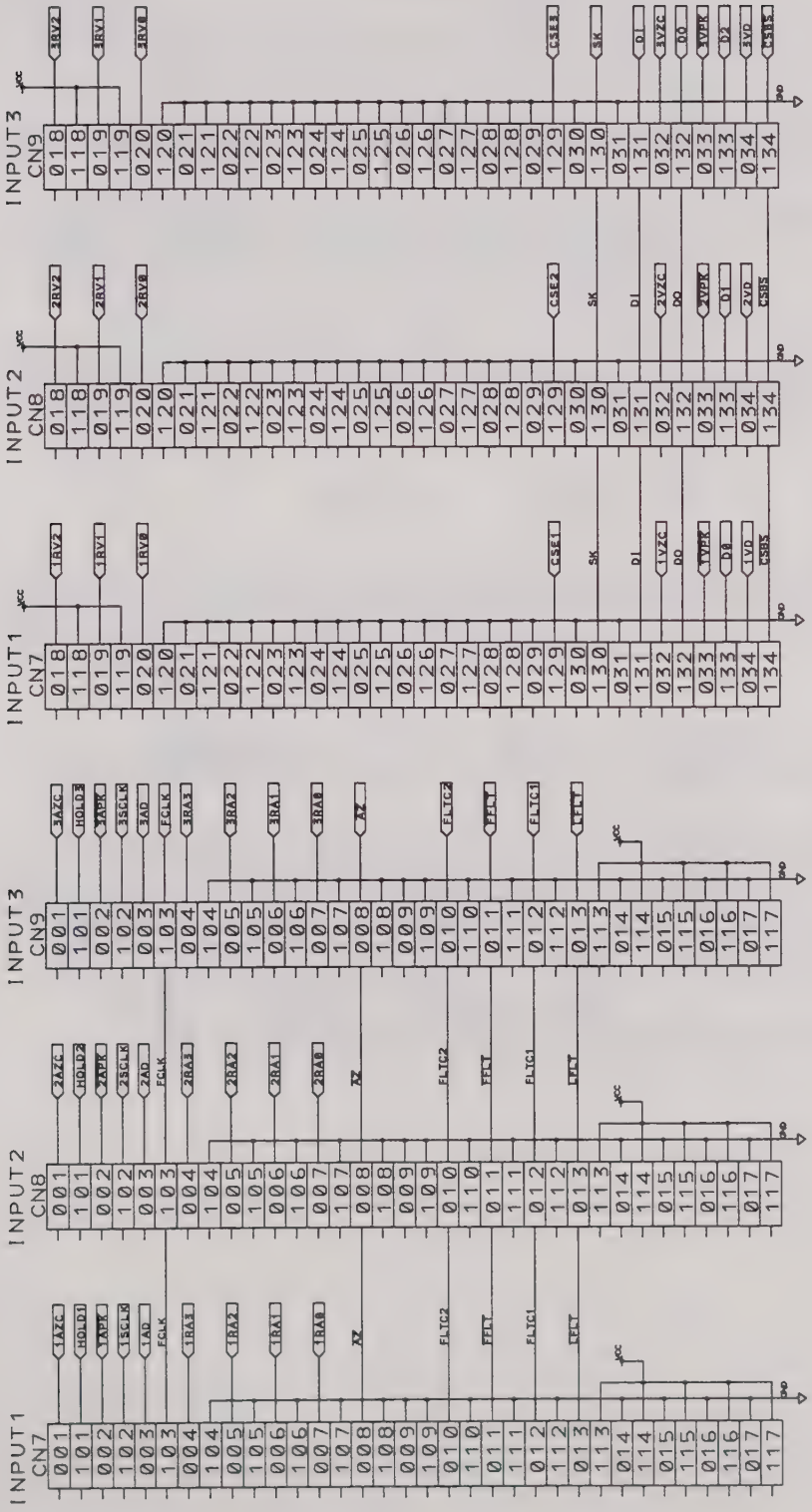

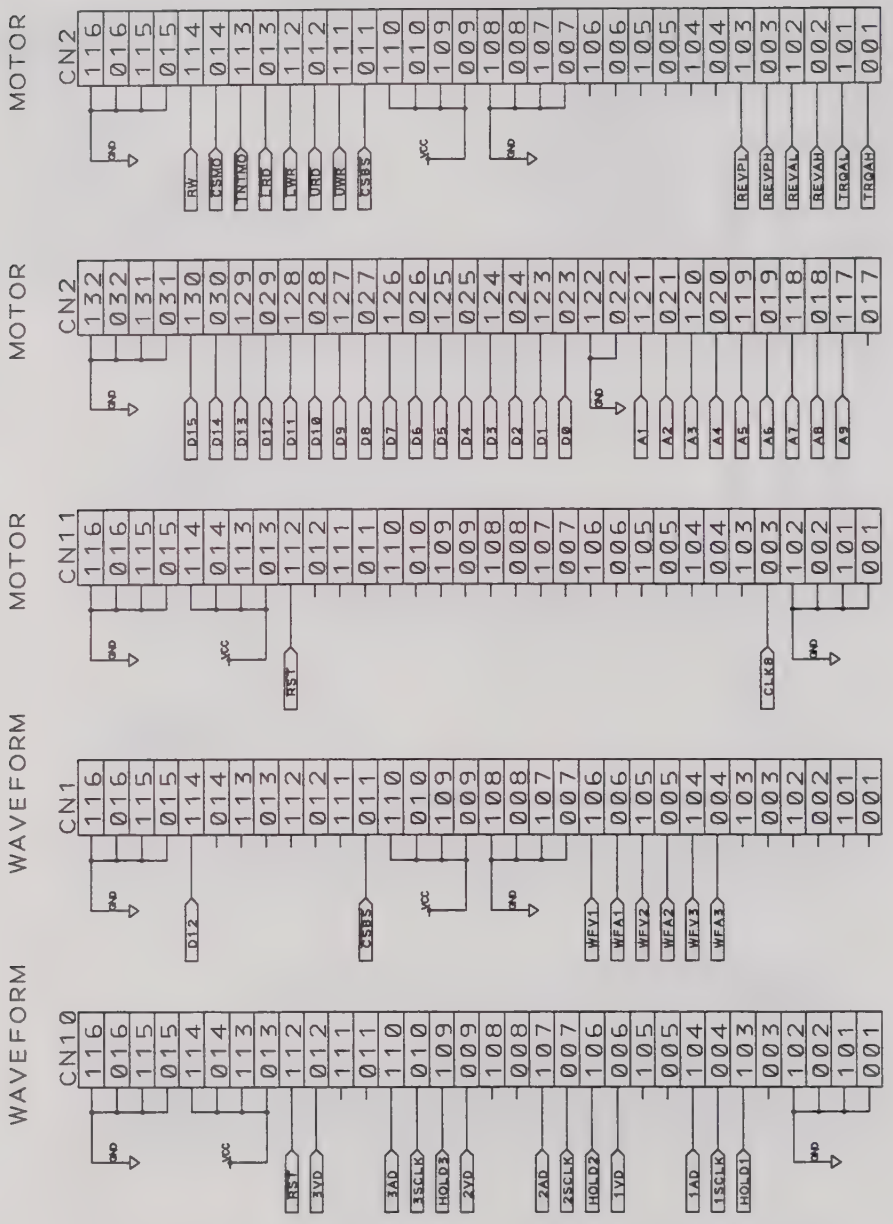
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INTMO
LRD
LWR
URD
UWR
CSBS
REVPL
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REVAL
REVAH
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MOTOR
CN2
D15
D14
D13
D12
D11
D10
D9
D8
D7
D6
D5
D4
D3
D2
D1
D0
A1
A2
A3
A4
A5
A6
A7
A8
A9
MOTOR
CN11
RST
CLK8
WAVEFORM
CN1
D12
CSBS
WFV1
WFA1
WFV2
WFA2
WFV3
WFA3
WAVEFORM
CN10
RST
3VD
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HOLD2
1VD
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1SCLK
HOLD1

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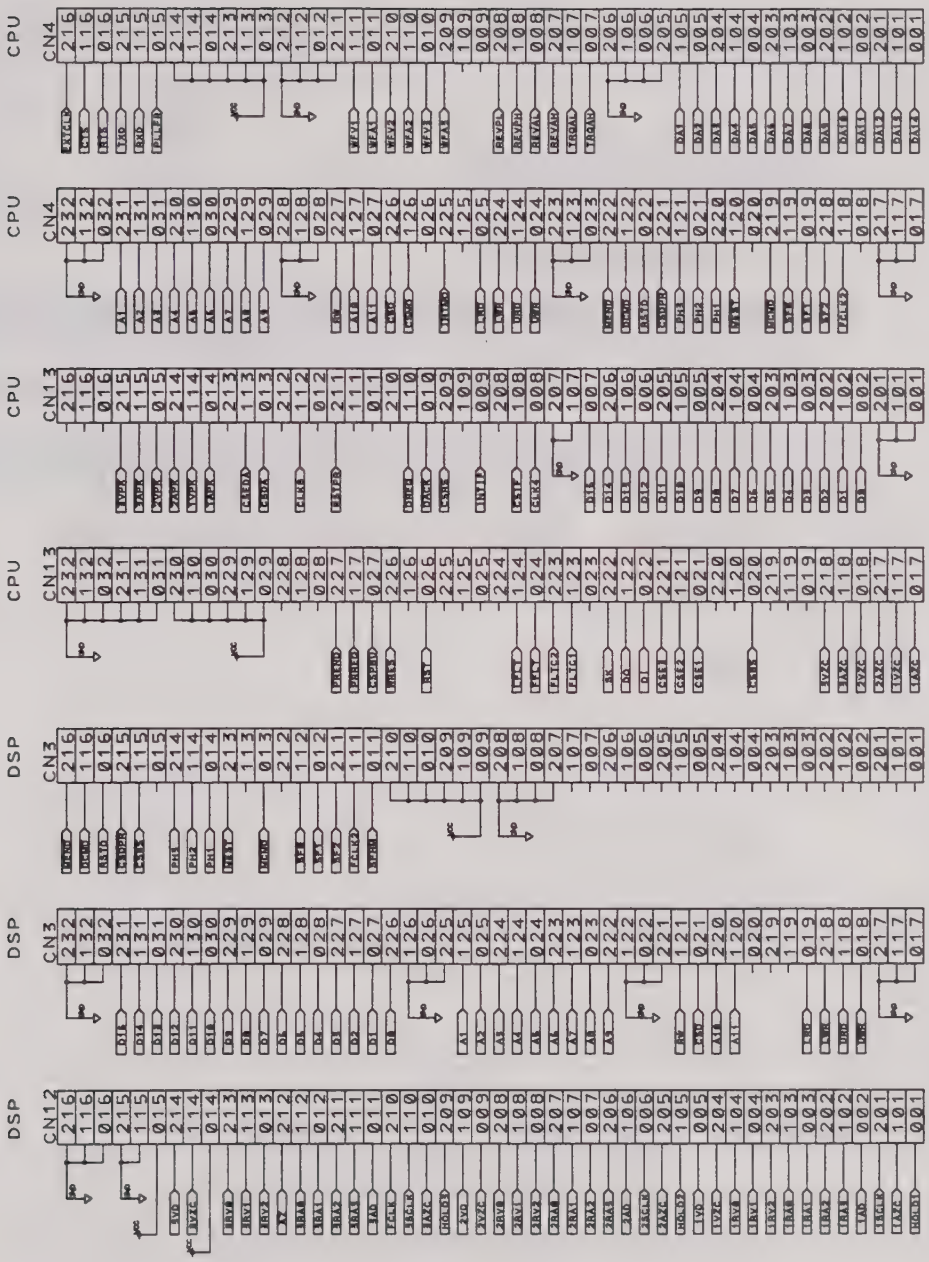
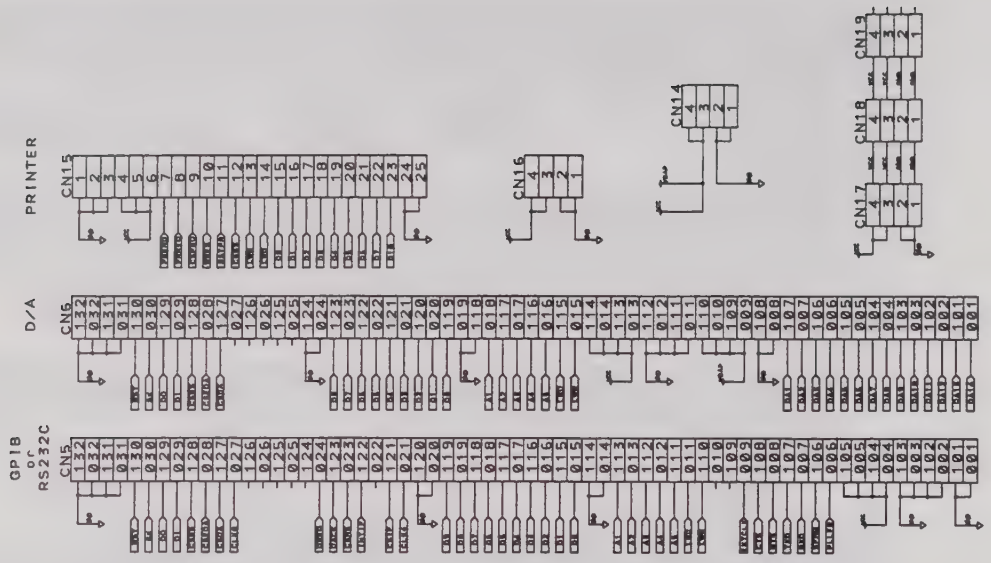
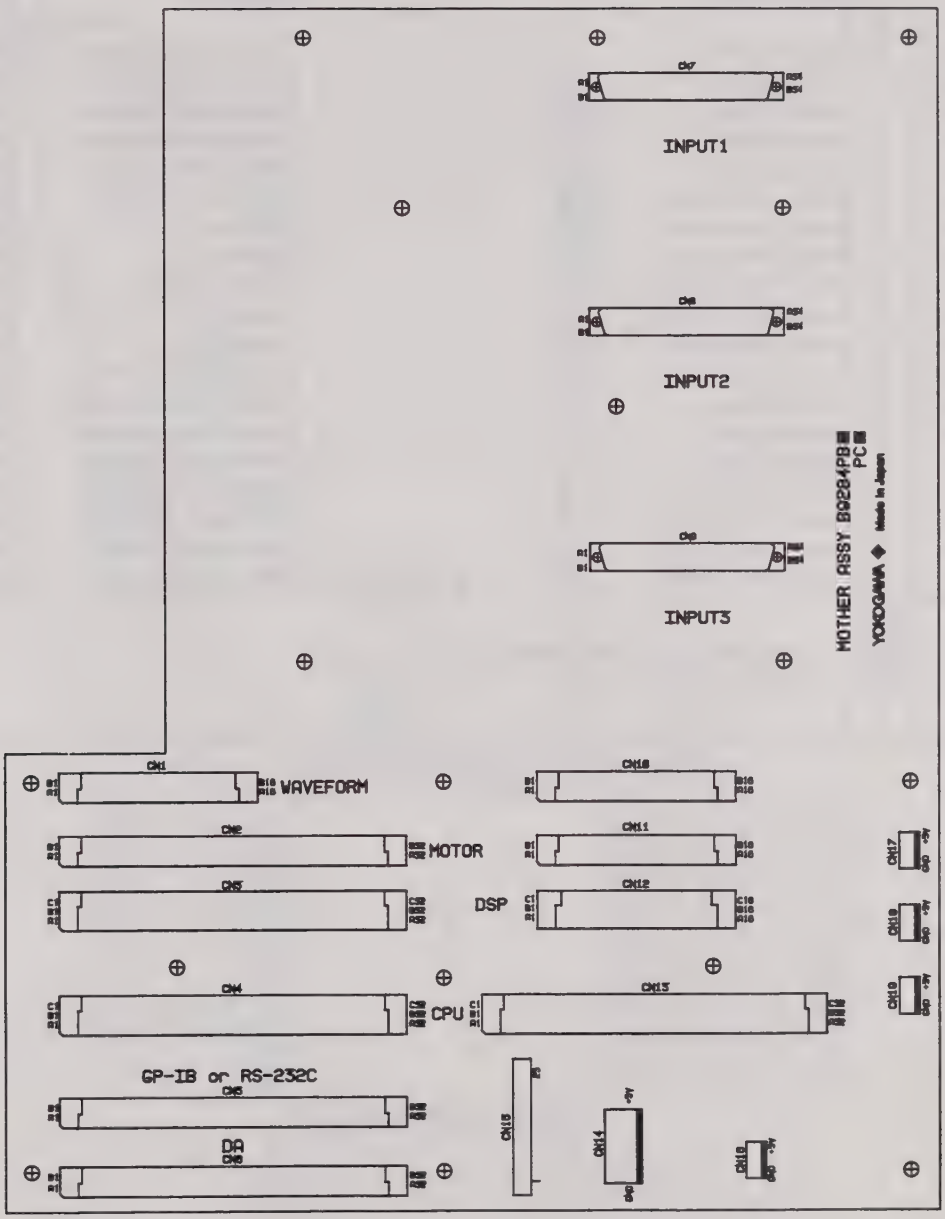



PRINTER
CN15
CN16
CN14
CN18
CN19
CN17
D/A
CN5
GPIB
or
RS232C
CN5

6.3.2 Location of Components



6.3.3 List of Electrical Parts (B9284PB, PC)

Item	Q'ty		Part Name	Description	MFR Part Name	MFR Name
1	1	1	MOTHER PWB		B9284QB	YOKOGAWA
CN1	1	1	BOARD CONN		PCN10C-32S-2.54DSA	HIROSE
CN10	1	1	BOARD CONN		PCN10C-32S-2.54DSA	HIROSE
CN11	1		BOARD CONN		PCN10C-32S-2.54DSA	HIROSE
CN12	1	1	BOARD CONN		PCN10C-48S-2.54DSA	HIROSE
CN13	1	1	BOARD CONN		PCN10C-96S-2.54DSA	HIROSE
CN14	1	1	POST TYPE CONN		5281-04A	MOLEX
CN15	1	1	POST TYPE CONN		HLEM25S-1	BURNDY
CN16	1	1	POST TYPE CONN		5045-04A	MOLEX
CN17	1	1	POST TYPE CONN		5045-04A	MOLEX
CN18	1		POST TYPE CONN		5045-04A	MOLEX
CN19	1		POST TYPE CONN		5045-04A	MOLEX
CN2	1		BOARD CONN		PCN10C-64S-2.54DSA	HIROSE
CN3	1	1	BOARD CONN		PCN10C-96S-2.54DSA	HIROSE
CN4	1	1	BOARD CONN		PCN10C-96S-2.54DSA	HIROSE
CN5	1	1	BOARD CONN		PCN10C-64S-2.54DSA	HIROSE
CN6	1	1	BOARD CONN		PCN10C-64S-2.54DSA	HIROSE
CN7	1		POST TYPE CONN		FX2C-68S-1.27DSAL	HIROSE
CN8	1	1	POST TYPE CONN		FX2C-68S-1.27DSAL	HIROSE
CN9	1		POST TYPE CONN		FX2C-68S-1.27DSAL	HIROSE
Assy. Part No.	B9824PB	B9824PC	B9824PB for Model 253620,253630,253640 B9824PC for Model 253610			

6.4 CPU Board Assembly (B9284PD)

6.4.1 Schematic Diagrams

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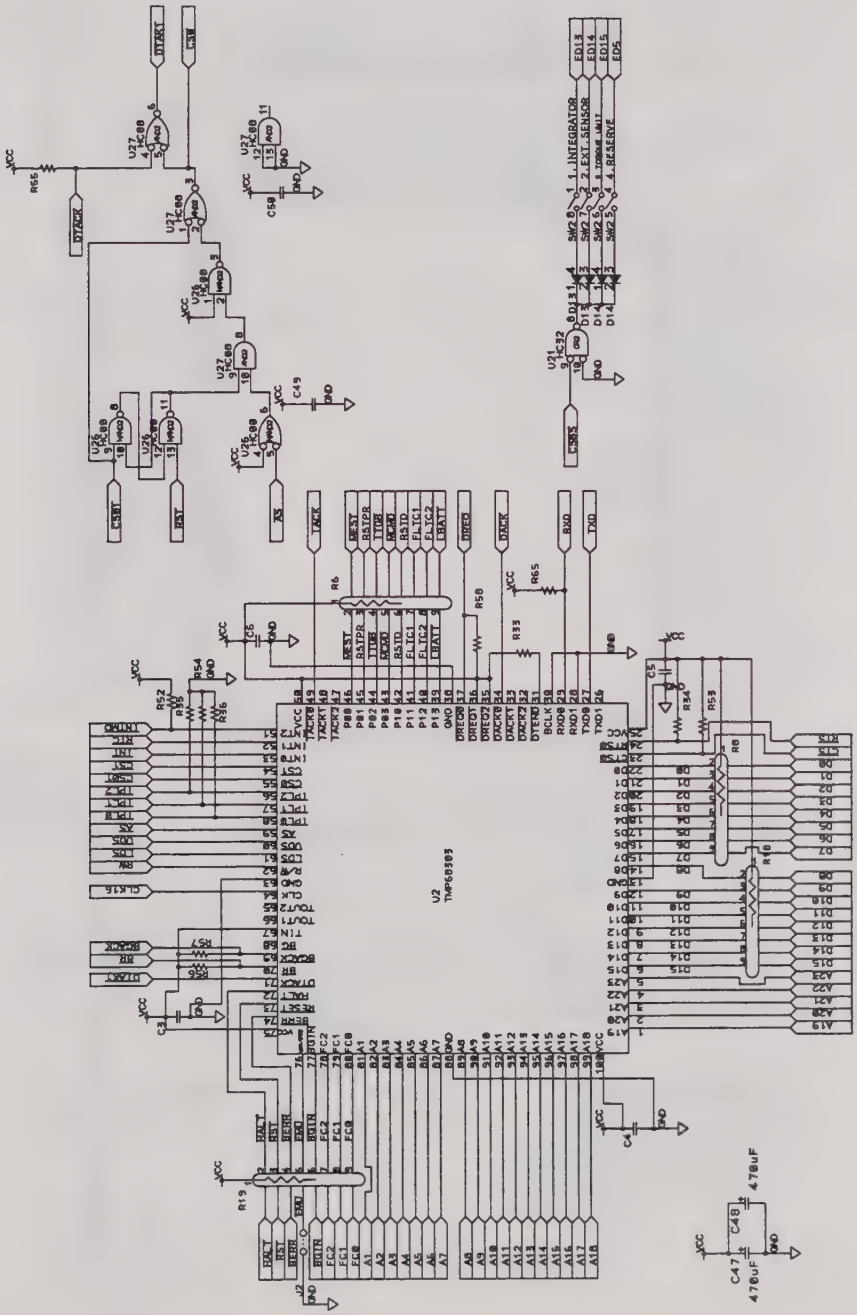

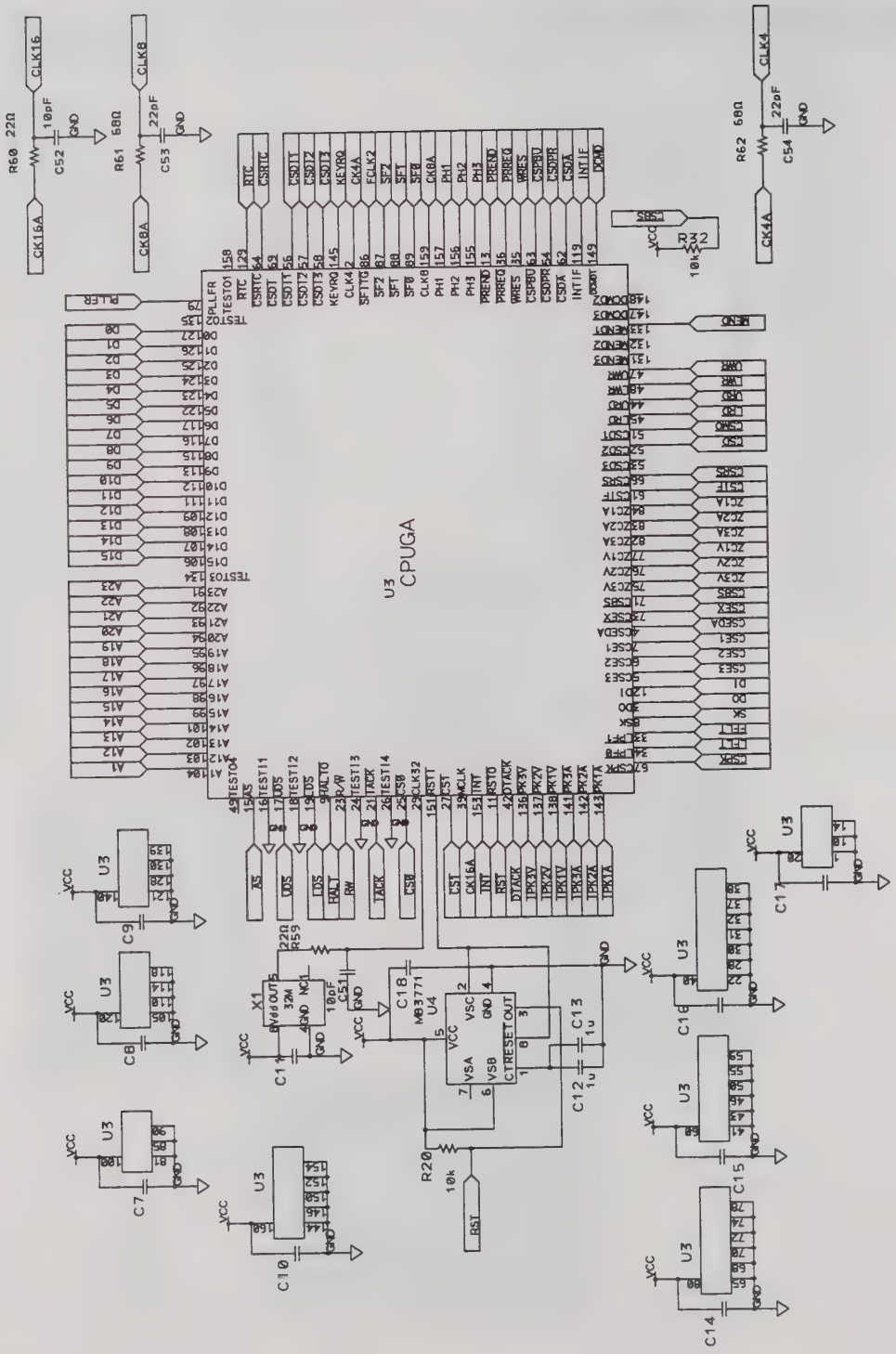
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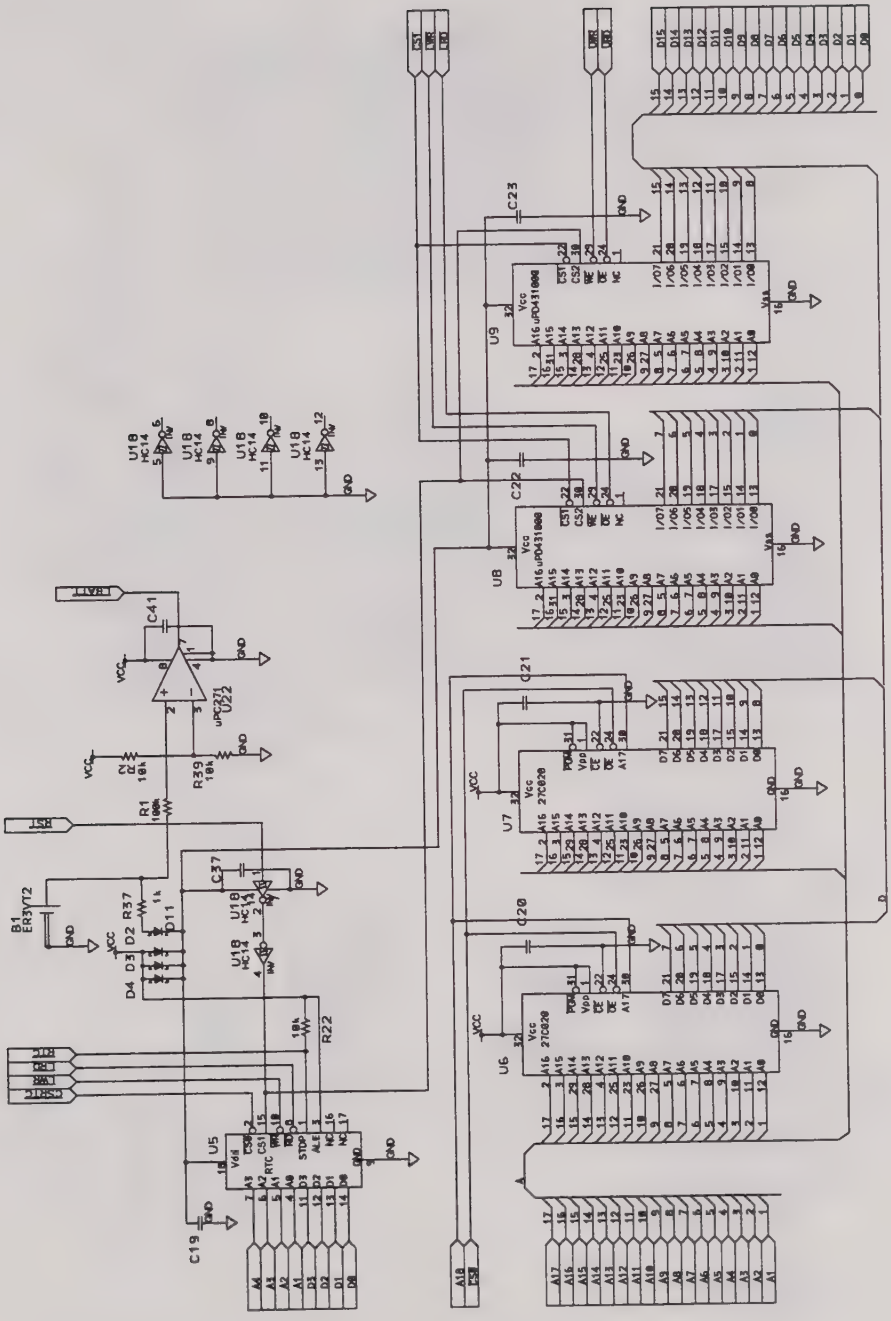
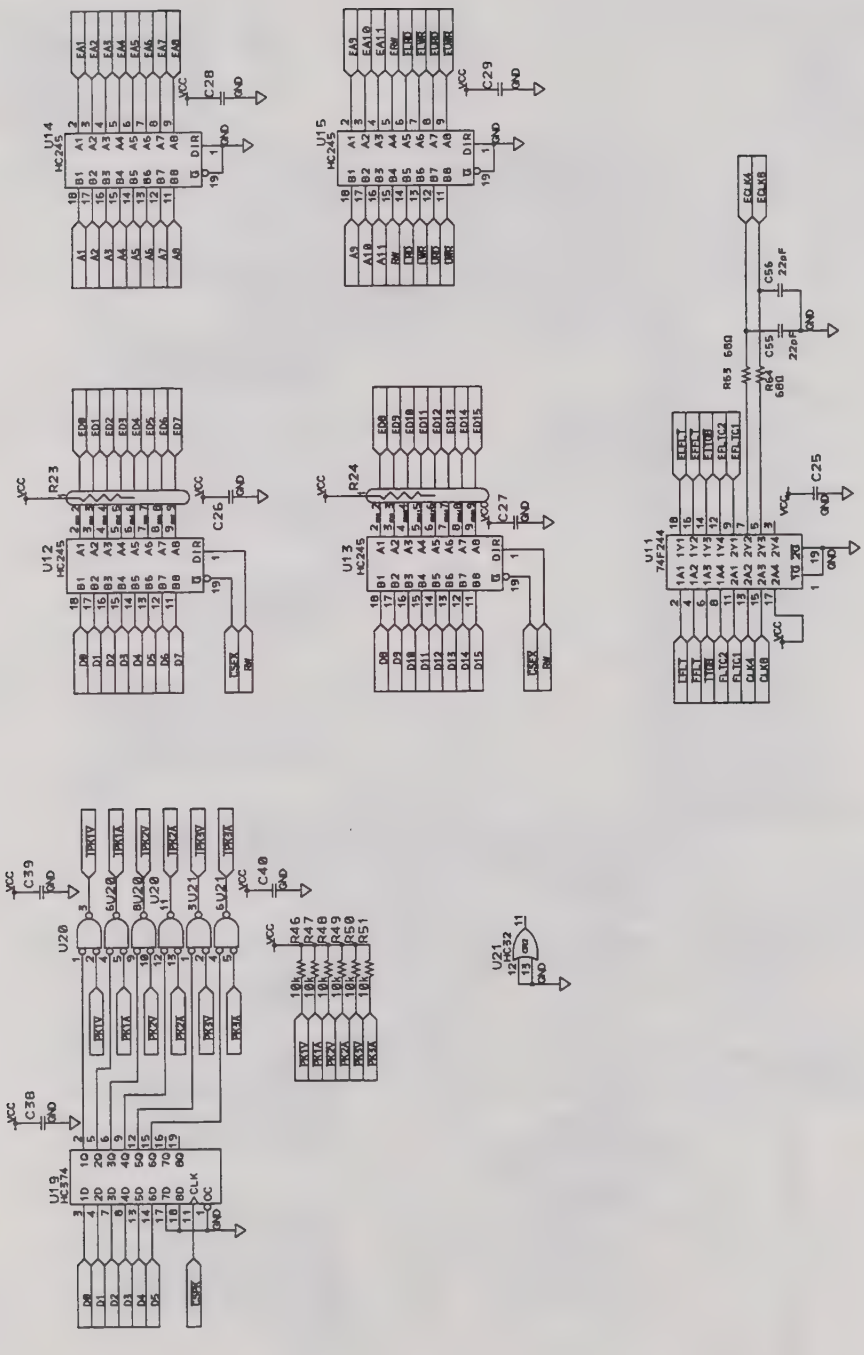
CPUGA
R60 22Ω
R61 68Ω
R62 68Ω
R32 10k
R20 10k
C52 10pF
C53 22pF
C54 22pF
X1
32M
U4
M83771
CK16A
CK8A
CK4A
RST
VCC
GND

Page 3 of 6





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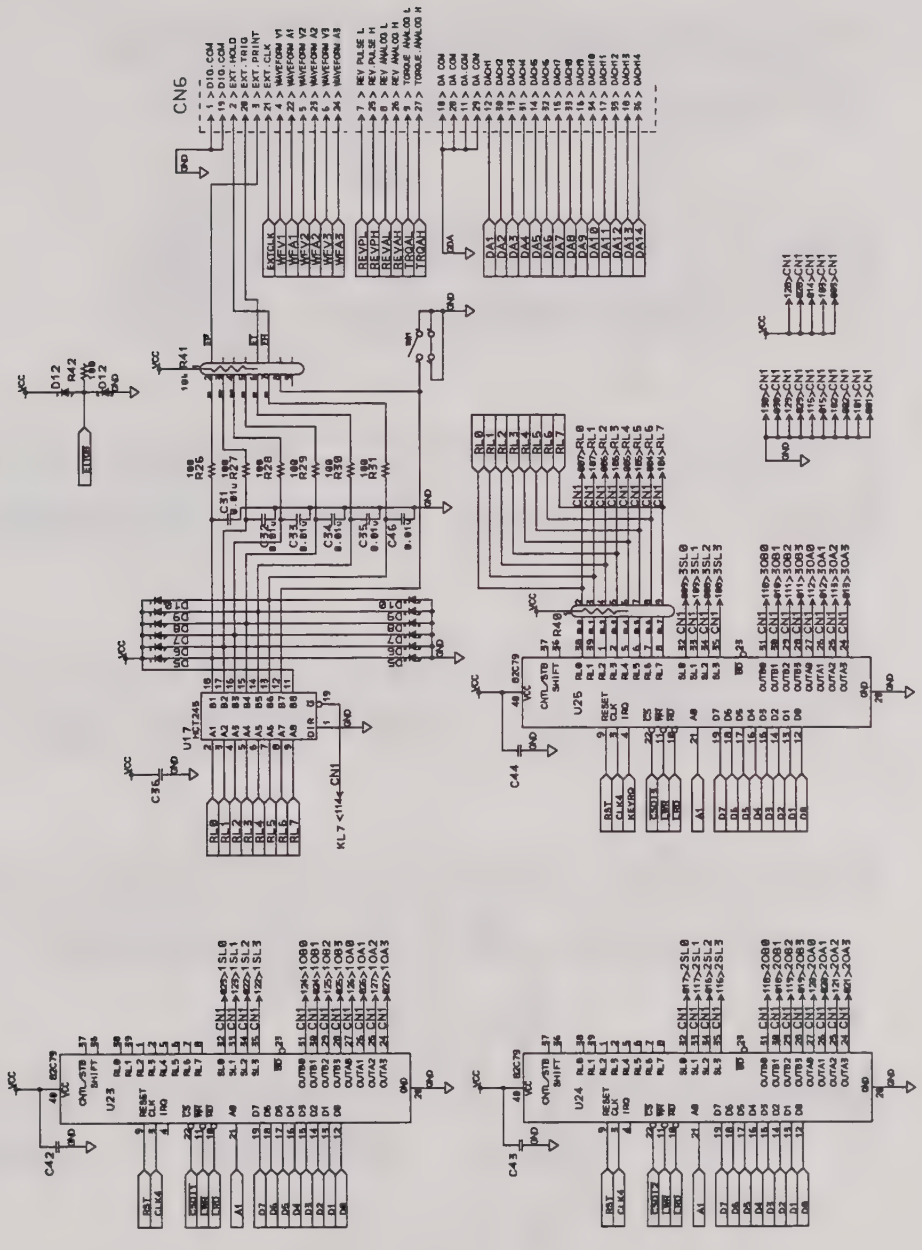
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U23
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C44
C42
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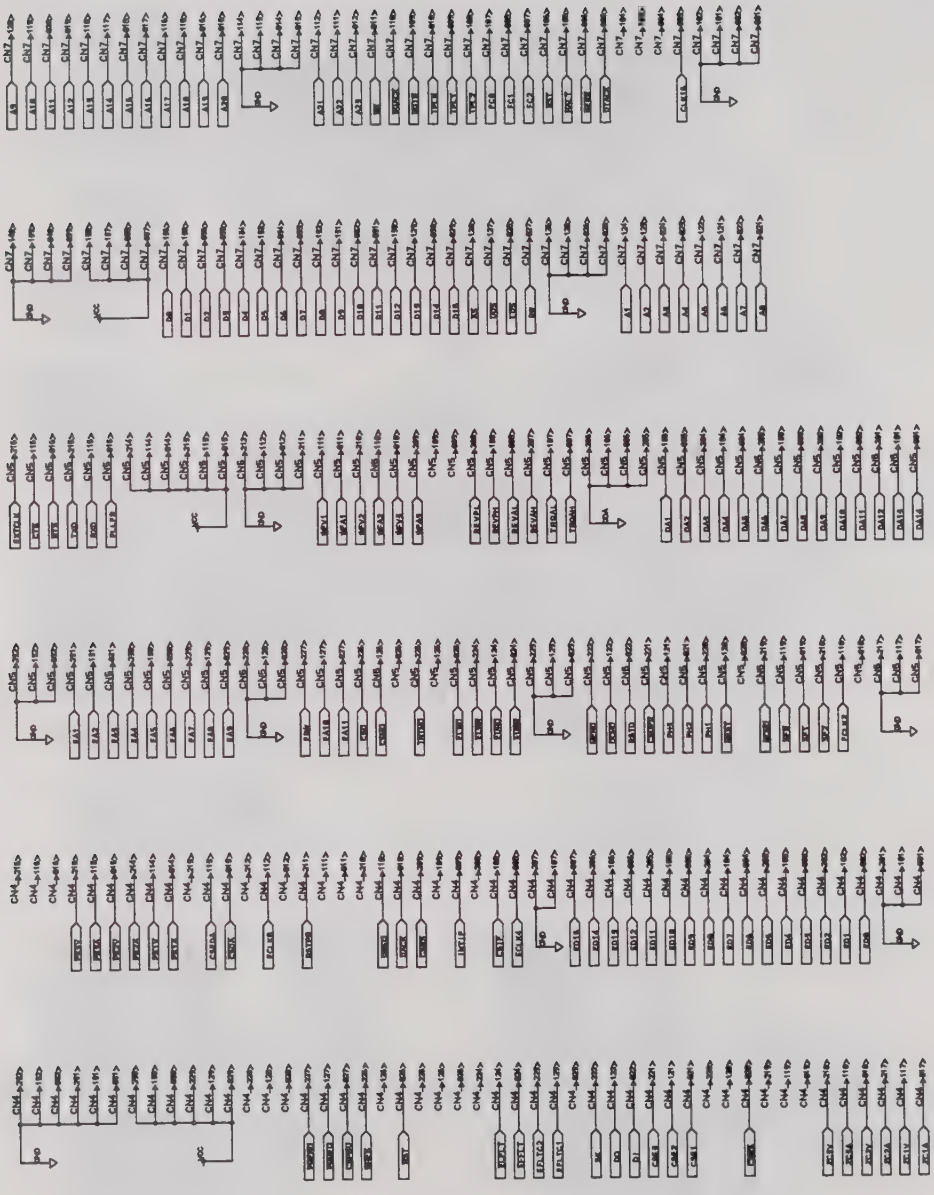
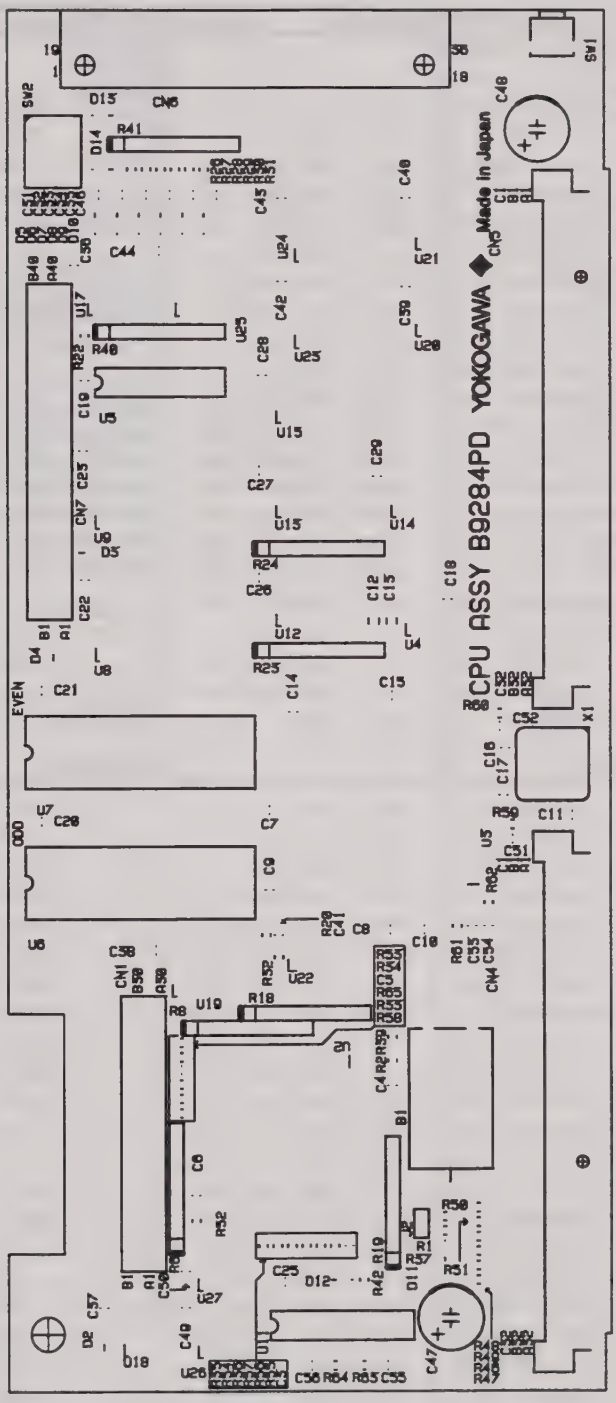
C36
R41
R42
R40
SW1
KL7 <1144-CN1



6.4.2 Location of Components



6.4.3 List of Electrical Parts (B9284PD)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	CPU SMC ASSY		B9284RD	YOKOGAWA
2	1	ODD ROM ASSY		B9284TD	YOKOGAWA
3	1	EVEN ROM ASSY		B9284UD	YOKOGAWA
4	2	SCREW MACHINE		Y9308LS	YOKOGAWA
B1	1	BATTERY		ER3VT2	TOSHIBA D.
C47	1	ALUMINUM CAP	470μF ±20% 16V	ECEA1CU471	MATSUSHITA
C48	1	ALUMINUM CAP	470μF ±20% 16V	ECEA1CU471	MATSUSHITA
CN1	1	POST TYPE CONN		TX13-60P-D2LT-N1	JAE
CN4	1	BOARD CONN		PCN10A-96P-2.54DS	HIROSE
CN5	1	BOARD CONN		PCN10A-96P-2.54DS	HIROSE
CN6	1	CABLE CONN		57LE-40360-7700(D12)	DDK
R18	1	RES MODULE	10kΩ ±5% 0.7W	MRGC09X10K J	TAMA
R19	1	RES MODULE	10kΩ ±5% 0.7W	MRGC09X10K J	TAMA
R23	1	RES MODULE	10kΩ ±5% 0.7W	MRGC09X10K J	TAMA
R24	1	RES MODULE	10kΩ ±5% 0.7W	MRGC09X10K J	TAMA
R40	1	RES MODULE	10kΩ ±5% 0.7W	MRGC09X10K J	TAMA
R41	1	RES MODULE	10kΩ ±5% 0.7W	MRGC09X10K J	TAMA
R6	1	RES MODULE	10kΩ ±5% 0.7W	MRGC09X10K J	TAMA
R8	1	RES MODULE	10kΩ ±5% 0.7W	MRGC09X10K J	TAMA
SW1	1	PUSH SWITCH		SKHHLM165A	ALPS
SW2	1	SLIDE SWITCH		KSD 04	OTAX
U11	1	TTL		74F244PC	FC
U6	1	SOCKET & HOLDER		DICF-32CS-E	JAE
U7	1	SOCKET & HOLDER		DICF-32CS-E	JAE
X1	1	CRYSTAL UNIT		1333/32MHZ	NIHONDENPA

List of Electrical Parts (B9284RD)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	CPU PWB		B9284QD	YOKOGAWA
C10	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C11	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C12	1	CERAMIC CAP	1μF-20～80% 16V	C13Y5V1C105ZP*	TOKIN
C13	1	CERAMIC CAP	1μF-20～80% 16V	C13Y5V1C105ZP*	TOKIN
C14	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C15	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C16	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C17	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C18	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C19	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C20	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C21	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C22	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C23	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C25	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C26	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C27	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C28	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C29	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C3	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C31	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C32	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C33	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C34	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C35	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C36	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C37	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C38	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C39	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C4	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C40	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C41	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C42	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C43	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C44	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C46	1	CERAMIC CAP	0.01μF ±10% 50V	ECU-*1H103KBG	MATSUSHITA
C49	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C5	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C50	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C51	1	CERAMIC CAP	10pF ±1P% 50V	C2012CH1H100F*	TDK
C52	1	CERAMIC CAP	10pF ±1P% 50V	C2012CH1H100F*	TDK
C53	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C54	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C55	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C56	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C6	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C7	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C8	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C9	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
D10	1	DIODE		MA159A	MATSUSHITA
D11	1	DIODE		MA159A	MATSUSHITA
D12	1	DIODE		MA159A	MATSUSHITA

List of Electrical Parts (B9284RD) Continued

Item	Q'ty	Part Name	Description			MFR Part Name	MFR Name
D13	1	DIODE				MA159A	MATSUSHITA
D14	1	DIODE				MA159A	MATSUSHITA
D2	1	DIODE				1SS294	TOSHIBA
D3	1	DIODE				1SS294	TOSHIBA
D4	1	DIODE				1SS294	TOSHIBA
D5	1	DIODE				MA159A	MATSUSHITA
D6	1	DIODE				MA159A	MATSUSHITA
D7	1	DIODE				MA159A	MATSUSHITA
D8	1	DIODE				MA159A	MATSUSHITA
D9	1	DIODE				MA159A	MATSUSHITA
R1	1	METAL OXIDE RES	100kΩ	±1%	0.1W	ERJ6ENF1003*	MATSUSHITA
R2	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R20	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R22	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R26	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R27	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R28	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R29	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R30	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R31	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R32	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R33	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R34	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R35	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R36	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R37	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R39	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R42	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R46	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R47	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R48	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R49	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R50	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R51	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R52	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R53	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R54	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R55	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R56	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R57	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R58	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R59	1	METAL OXIDE RES	22Ω	±1%	0.1W	ERJ6ENF22R0*	MATSUSHITA
R60	1	METAL OXIDE RES	22Ω	±1%	0.1W	ERJ6ENF22R0*	MATSUSHITA
R61	1	METAL OXIDE RES	68Ω	±1%	0.1W	ERJ6ENF68R0*	MATSUSHITA
R62	1	METAL OXIDE RES	68Ω	±1%	0.1W	ERJ6ENF68R0*	MATSUSHITA
R63	1	METAL OXIDE RES	220Ω	±1%	0.1W	ERJ6ENF2200*	MATSUSHITA
R64	1	METAL OXIDE RES	220Ω	±1%	0.1W	ERJ6ENF2200*	MATSUSHITA
R65	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
U12	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U13	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U14	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U15	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U17	1	CMOS LOGIC				UPD74HCT245GS	NEC

List of Electrical Parts (B9284RD) Continued

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
U18	1	CMOS LOGIC		TC74HC14AF	TOSHIBA
U19	1	CMOS LOGIC		TC74HC374AF	TOSHIBA
U2	1	MPU & PRPHL		TMP68303F-16	TOSHIBA
U20	1	CMOS LOGIC		TC74HC32AF	TOSHIBA
U21	1	CMOS LOGIC		TC74HC32AF	TOSHIBA
U22	1	COMPARATOR IC		UPC271G2	NEC
U23	1	MPU & PRPHL		TMP82C79M-2	TOSHIBA
U24	1	MPU & PRPHL		TMP82C79M-2	TOSHIBA
U25	1	MPU & PRPHL		TMP82C79M-2	TOSHIBA
U26	1	CMOS LOGIC		TC74HC00AF	TOSHIBA
U27	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U3	1	ASIC		MBCG10103-174	FUJITSU
U4	1	IC		MB3771PF	FUJITSU
U8	1	MEMORY		HM628128BLFP-8	HITACHI
U9	1	MEMORY		HM628128BLFP-8	HITACHI

6.5 DSP Board Assembly (B9284PE)

6.5.1 Schematic Diagrams

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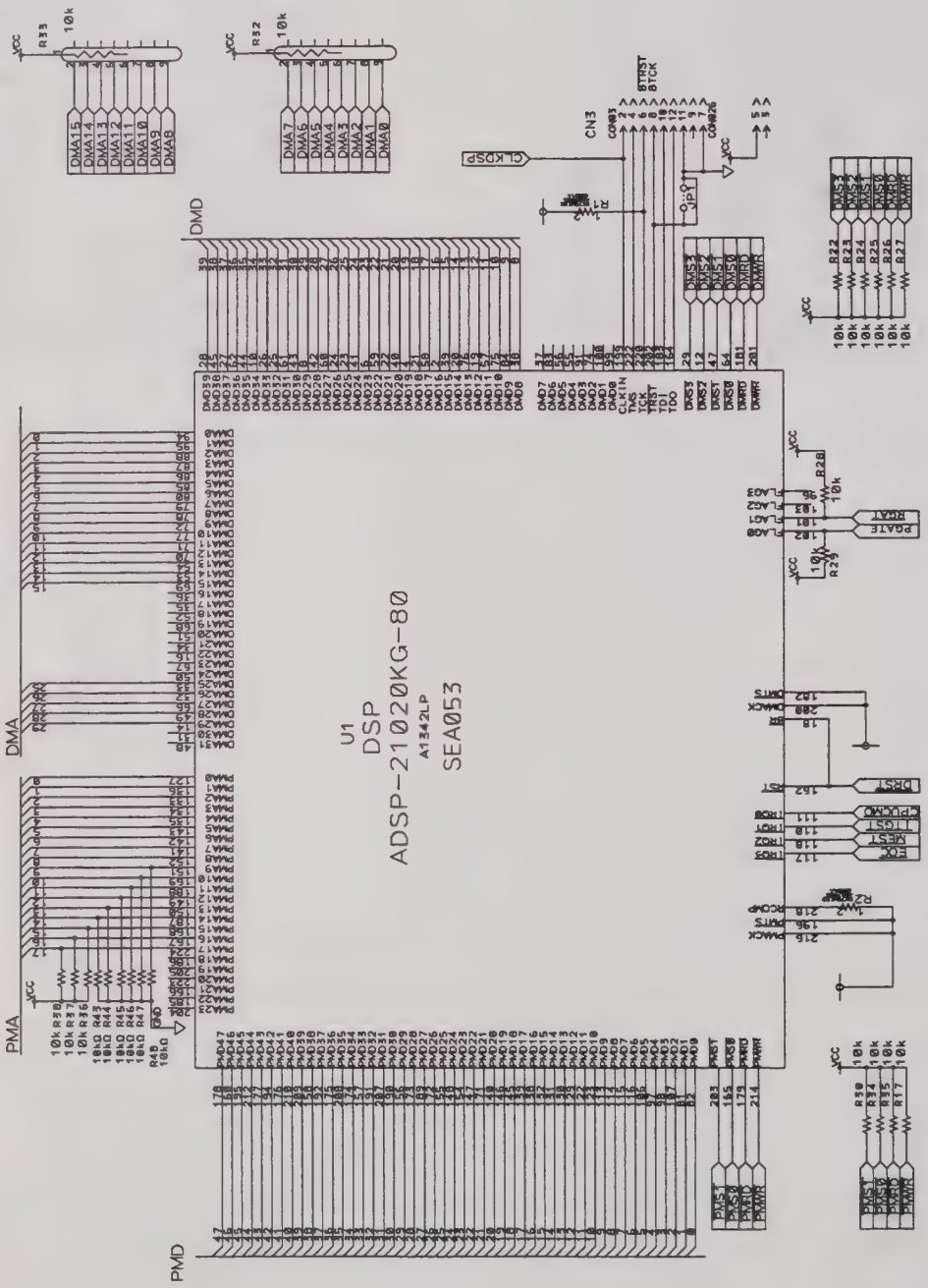

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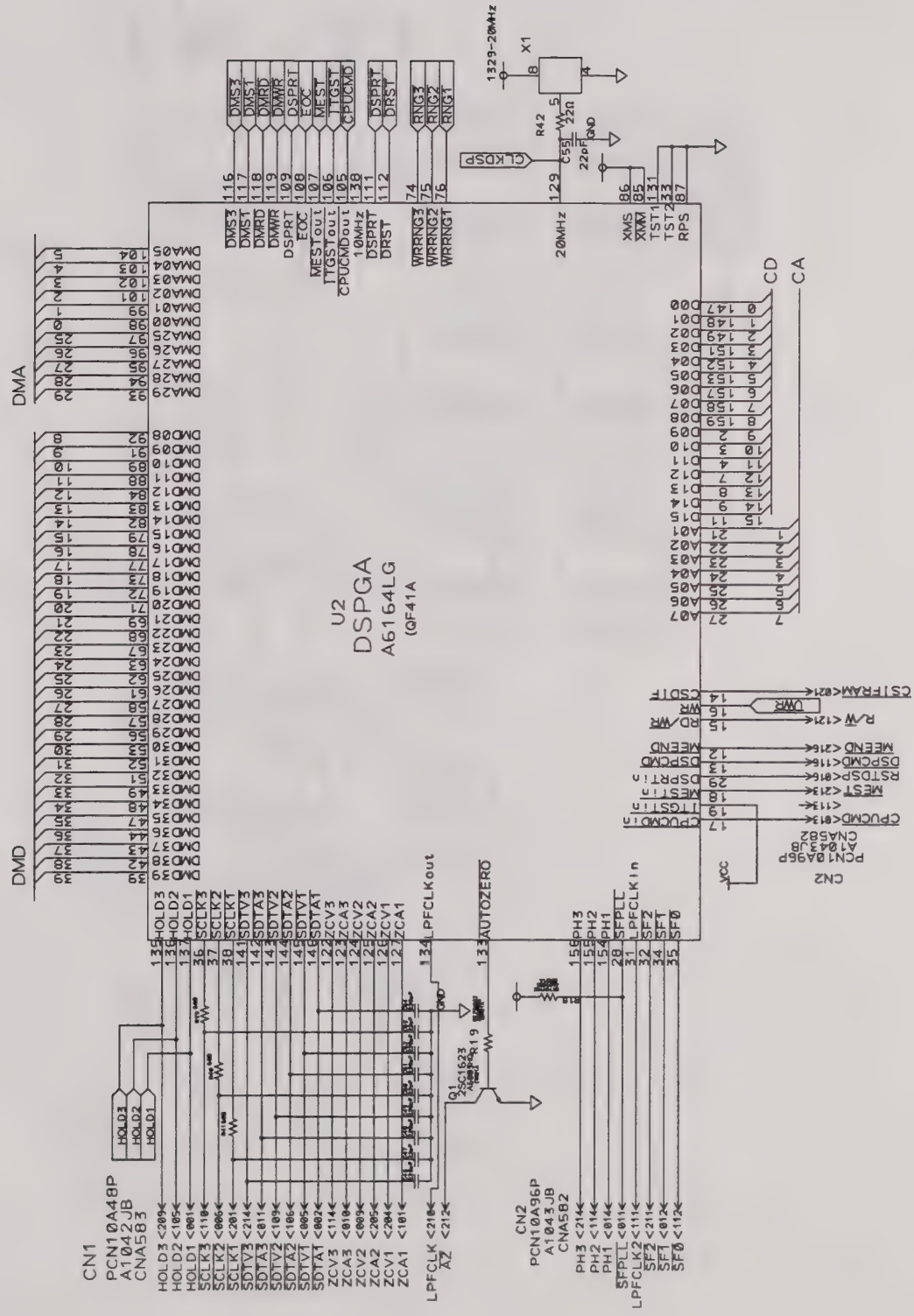
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A6164LG
(QF41A
DMA
DMD
CD
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PCN10A48P
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CNA583
CN2
PCN10A96P
A1043JB
CNA582
CN2
A7104JB
CNA582
PCN10A96P
1329-20MHz
X1
20MHz
10MHz
LPFCLKout
AUTOZERO
LPFCLKin
CSDIF
R/W
CWR
RD
WR
MEEND
DSPCMD
RSTDSP
DSPRT
MEST
TTGST
CPUCMD
CSIFRAM
DMS3
DMST
DMRD
DMWR
DSPRT
EOC
MEST
TTGST
CPUCMD
DSPRT
DRST
RNG3
RNG2
RNG1
XMS
XMM
TST1
TST2
RPS
HOLD3
HOLD2
HOLD1
SCLK3
SCLK2
SCLK1
SDTV3
SDTA3
SDTV2
SDTA2
SDTV1
SDTAT
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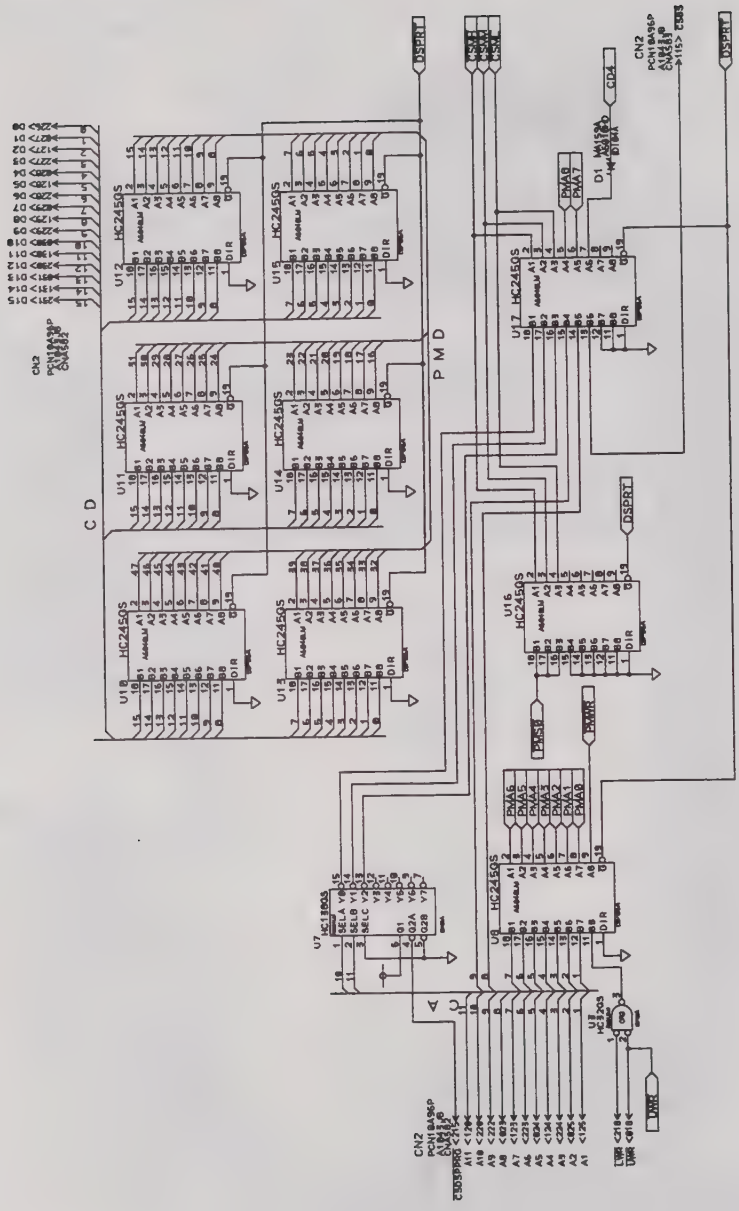
ZCA2
ZCV1
ZCA1
PH3
PH2
PH1
SFPLL
SF2
SF1
SF0



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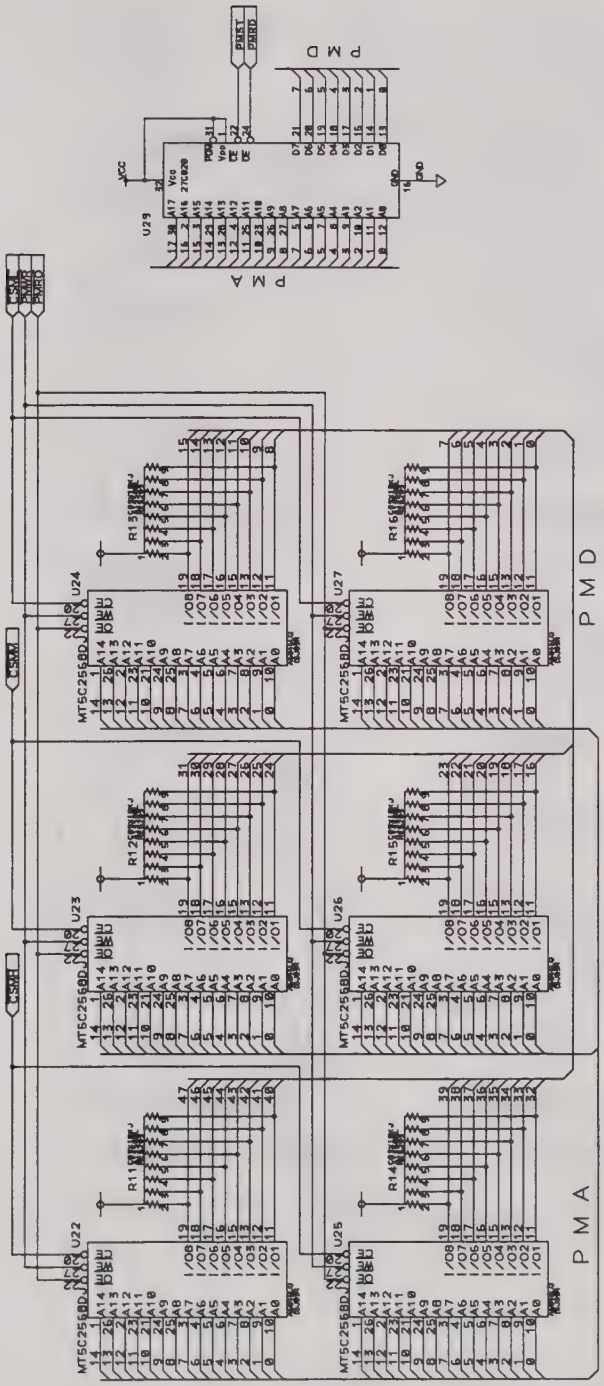

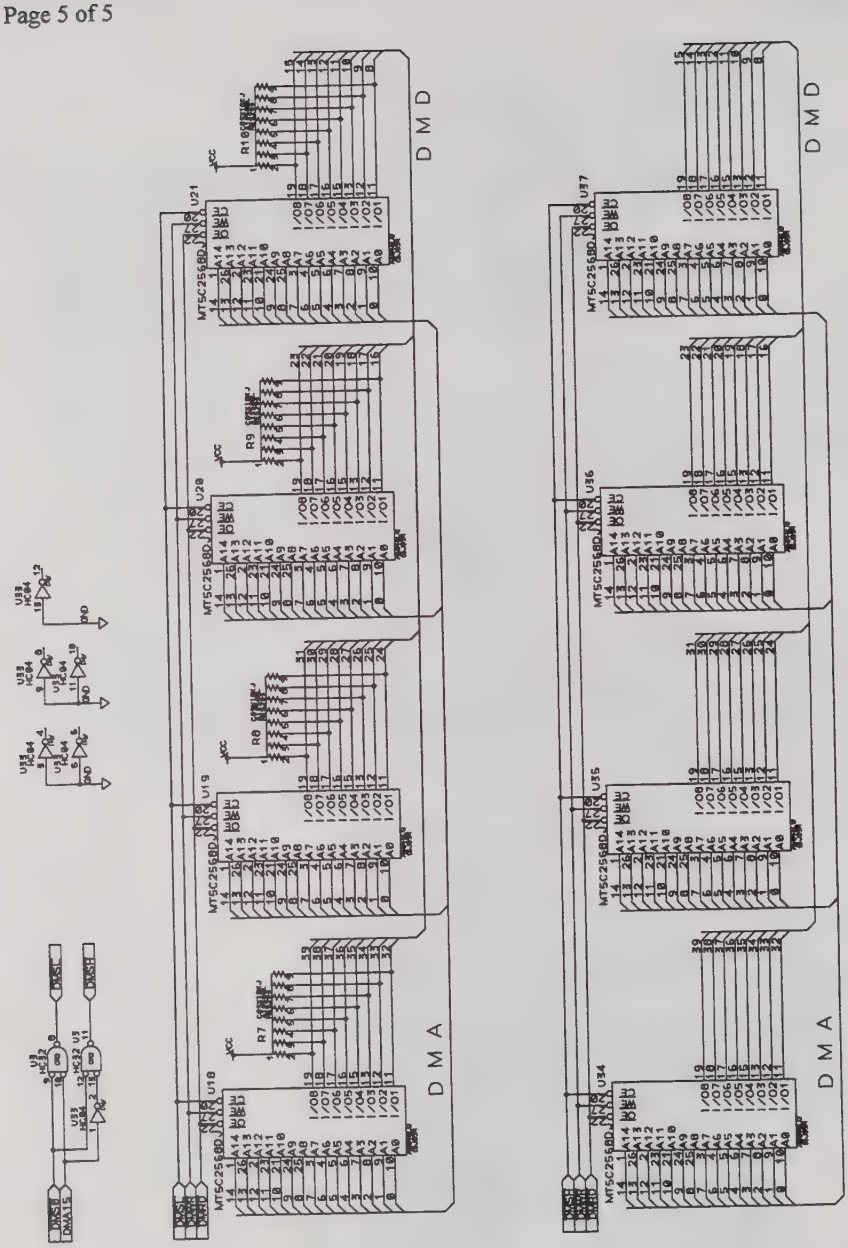
DMD
DMA
DMD
DMA

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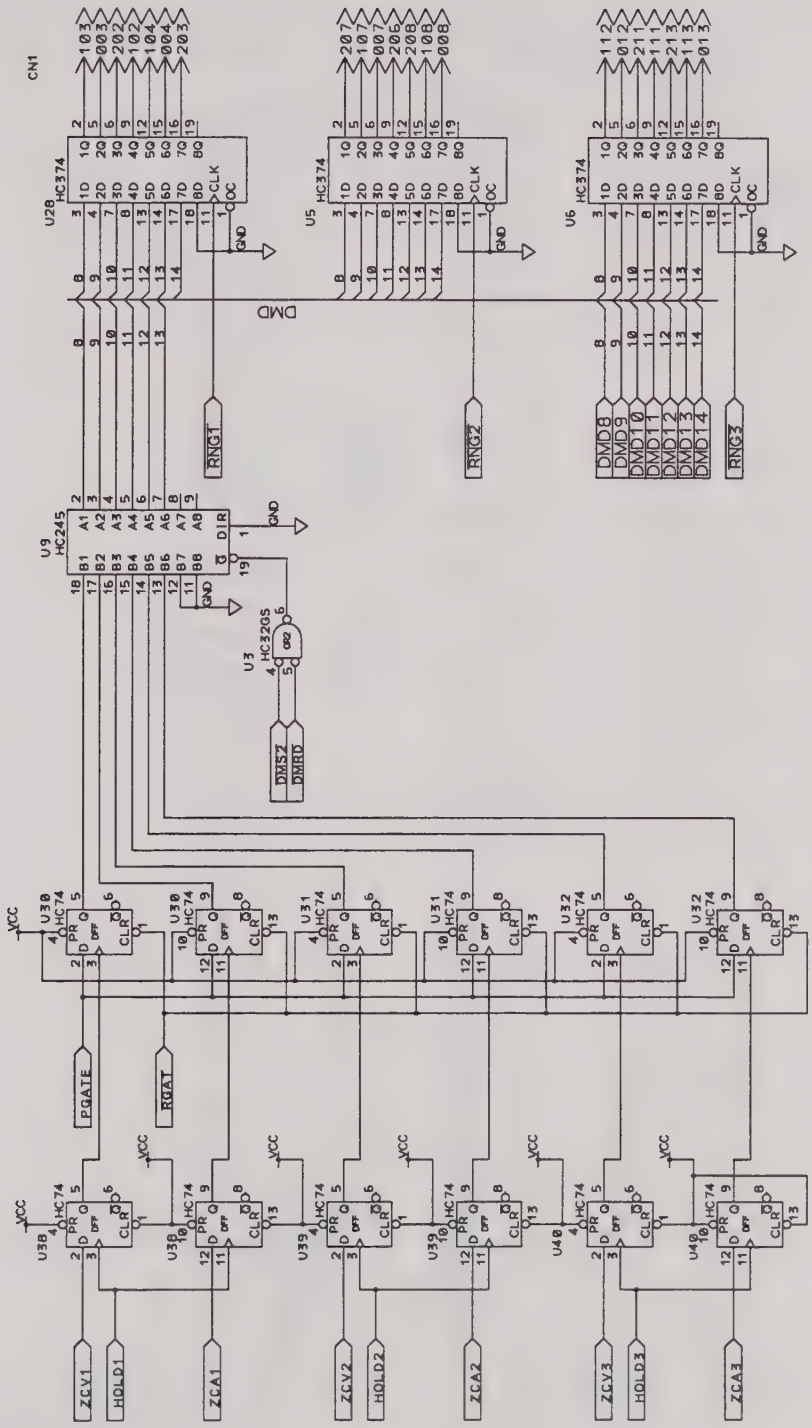
CN1
U28 HC374
U5 HC374
U6 HC374
DMD
RNG1
RNG2
RNG3
DMD8
DMD9
DMD10
DMD11
DMD12
DMD13
DMD14
U9 HC245
U3 HC32GS
DMSZ
DMRD
VCC
GND
U30 HC74
U31 HC74
U32 HC74
U38 HC74
U39 HC74
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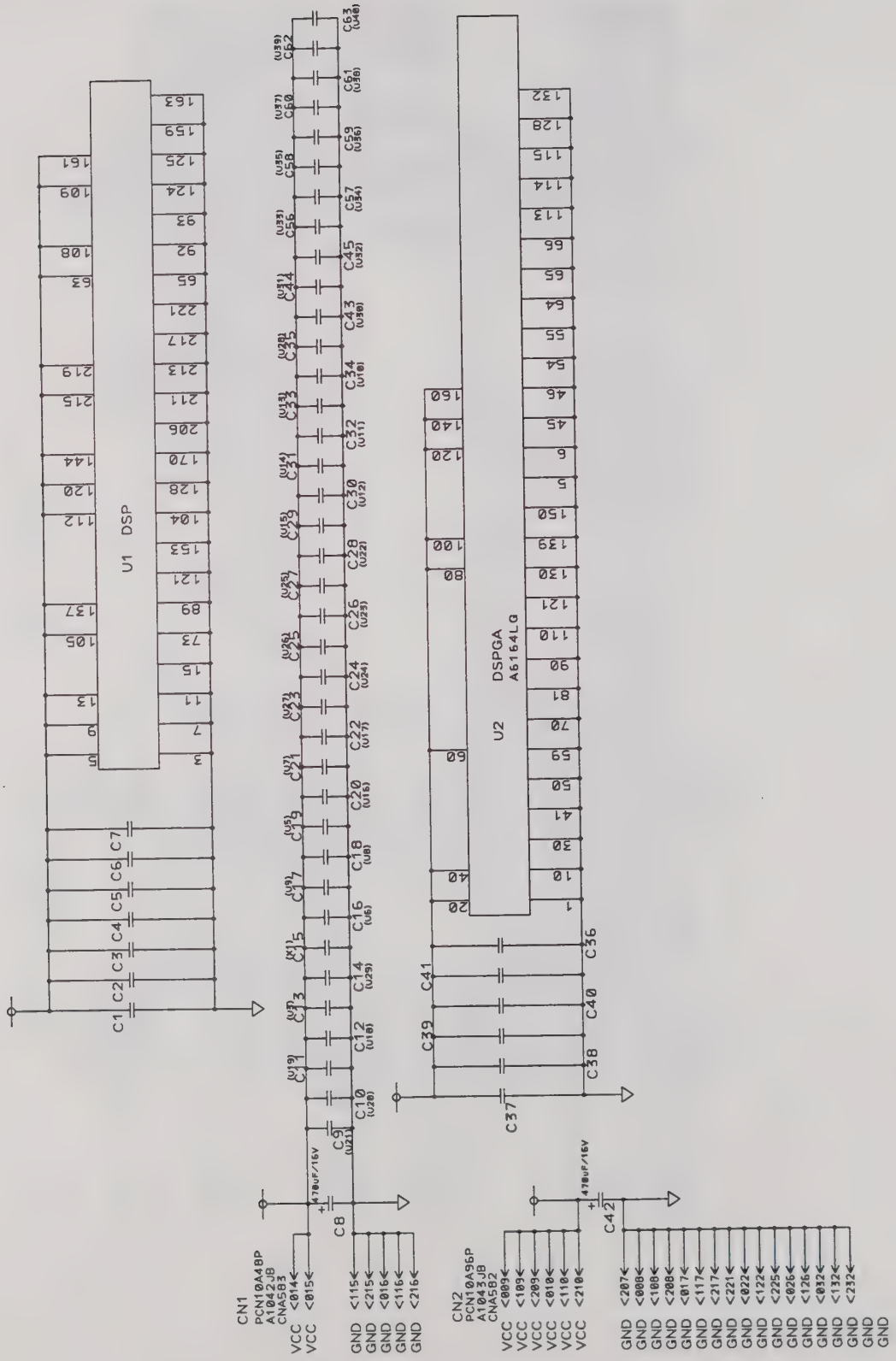
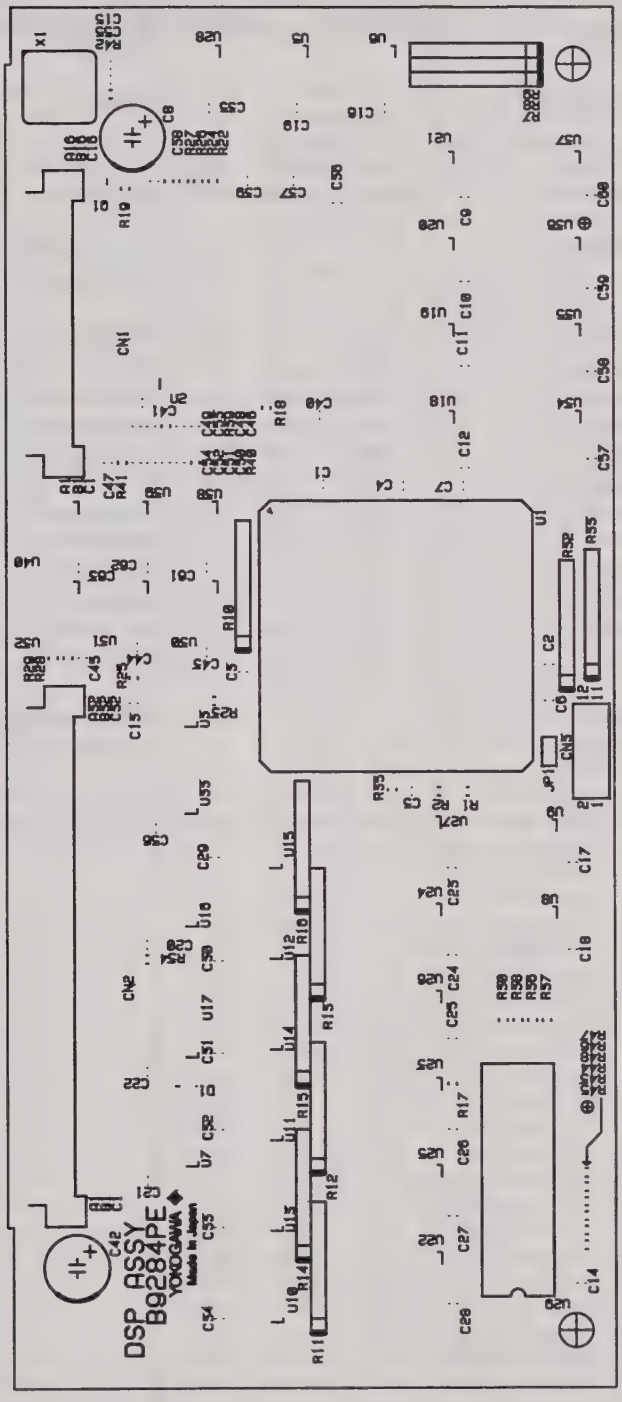
HOLD3
ZCA3


U1 DSP
U2 DSPGA A61164LG
CN1 PCN10A48P A1042JB CNA583
CN2 PCN10A96P A1043JB CNA583B
470uF/16V
VCC
GND

6.5.2 Location of Components



6.5.3 List of Electrical Parts (B9284PE)

Item	Q'ty	Part Name	Description			MFR Part Name	MFR Name
1	1	DSP SMC ASSY				B9284RE	YOKOGAWA
2	1	DSP ROM ASSY				B9284TE	YOKOGAWA
C42	1	ALUMINUM CAP	470 μF	±20%	16V	ECEA1CU471	MATSUSHITA
C8	1	ALUMINUM CAP	470 μF	±20%	16V	ECEA1CU471	MATSUSHITA
CN1	1	BOARD CONN				PCN10A-48P-2.54DS	HIROSE
CN2	1	BOARD CONN				PCN10A-96P-2.54DS	HIROSE
R10	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R11	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R12	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R13	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R14	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R15	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R16	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R32	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R33	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R7	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R8	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R9	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
U1	1	MPU & PRPHL				ADSP-21020KG-80	AD
U29	1	SOCKET & HOLDER				DICF-32CS-E	JAE
X1	1	CRYSTAL UNIT				1329-20MHZ	NIHONDENPA

List of Electrical Parts (B9284RE)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	DSP PWB		B9284QE	YOKOGAWA
C1	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C10	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C11	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C12	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C13	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C14	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C15	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C16	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C17	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C18	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C19	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C2	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C20	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C21	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C22	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C23	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C24	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C25	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C26	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C27	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C28	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C29	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C3	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C30	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C31	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C32	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C33	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C34	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C35	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C36	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C37	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C38	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C39	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C4	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C40	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C41	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C43	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C44	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C45	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C46	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C47	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C48	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C49	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C5	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C50	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C51	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C52	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C53	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C54	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C55	1	CERAMIC CAP	22pF ±5% 50V	C2012CH1H220J*	TDK
C56	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C57	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C58	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C59	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C6	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C60	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C61	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C62	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C63	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C7	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
C9	1	CER CAPACITOR	0.1μF -20~80% 50V	C2012Y5V1H104Z*	TDK
D1	1	DIODE		MA159A	MATSUSHITA

List of Electrical Parts (B9284PE) Continued

Item	Q'ty	Part Name	Description			MFR Part Name	MFR Name
Q1	1	TRANSISTOR				2SC1623(M)-L5,L6,L7	NEC
R1	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R17	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R18	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R19	1	METAL OXIDE RES	6.8kΩ	±1%	0.1W	ERJ6ENF6801*	MATSUSHITA
R2	1	METAL OXIDE RES	1.8kΩ	±1%	0.1W	ERJ6ENF1801*	MATSUSHITA
R22	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R23	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R24	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R25	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R26	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R27	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R28	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R29	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R30	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R34	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R35	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R36	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R37	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R38	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R39	1	METAL OXIDE RES	68Ω	±1%	0.1W	ERJ6ENF68R0*	MATSUSHITA
R40	1	METAL OXIDE RES	68Ω	±1%	0.1W	ERJ6ENF68R0*	MATSUSHITA
R41	1	METAL OXIDE RES	68Ω	±1%	0.1W	ERJ6ENF68R0*	MATSUSHITA
R42	1	METAL OXIDE RES	22Ω	±1%	0.1W	ERJ6ENF22R0*	MATSUSHITA
R43	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R44	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R45	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R46	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R47	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R48	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
U10	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U11	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U12	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U13	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U14	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U15	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U16	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U17	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U18	1	MEMORY				MT5C2568DJ-20Z	MICRON
U19	1	MEMORY				MT5C2568DJ-20Z	MICRON
U2	1	ASIC				MBCG24283-6195	FUJITSU
U20	1	MEMORY				MT5C2568DJ-20Z	MICRON
U21	1	MEMORY				MT5C2568DJ-20Z	MICRON
U22	1	MEMORY				MT5C2568DJ-20Z	MICRON
U23	1	MEMORY				MT5C2568DJ-20Z	MICRON
U24	1	MEMORY				MT5C2568DJ-20Z	MICRON
U25	1	MEMORY				MT5C2568DJ-20Z	MICRON
U26	1	MEMORY				MT5C2568DJ-20Z	MICRON
U27	1	MEMORY				MT5C2568DJ-20Z	MICRON
U28	1	CMOS LOGIC				TC74HC374AF	TOSHIBA
U3	1	CMOS LOGIC				TC74HC32AF	TOSHIBA
U30	1	CMOS LOGIC				TC74HC74AF	TOSHIBA
U31	1	CMOS LOGIC				TC74HC74AF	TOSHIBA
U32	1	CMOS LOGIC				TC74HC74AF	TOSHIBA
U33	1	CMOS LOGIC				TC74HC04AF	TOSHIBA
U34	1	MEMORY				MT5C2568DJ-20Z	MICRON
U35	1	MEMORY				MT5C2568DJ-20Z	MICRON
U36	1	MEMORY				MT5C2568DJ-20Z	MICRON
U37	1	MEMORY				MT5C2568DJ-20Z	MICRON
U38	1	CMOS LOGIC				TC74HC74AF	TOSHIBA
U39	1	CMOS LOGIC				TC74HC74AF	TOSHIBA
U40	1	CMOS LOGIC				TC74HC74AF	TOSHIBA
U5	1	CMOS LOGIC				TC74HC374AF	TOSHIBA
U6	1	CMOS LOGIC				TC74HC374AF	TOSHIBA
U7	1	CMOS LOGIC				TC74HC138AF	TOSHIBA
U8	1	CMOS LOGIC				TC74HC245AF	TOSHIBA
U9	1	CMOS LOGIC				TC74HC245AF	TOSHIBA

6.6 Display Board Assembly (B9284PF)

6.6.1 Schematic Diagrams

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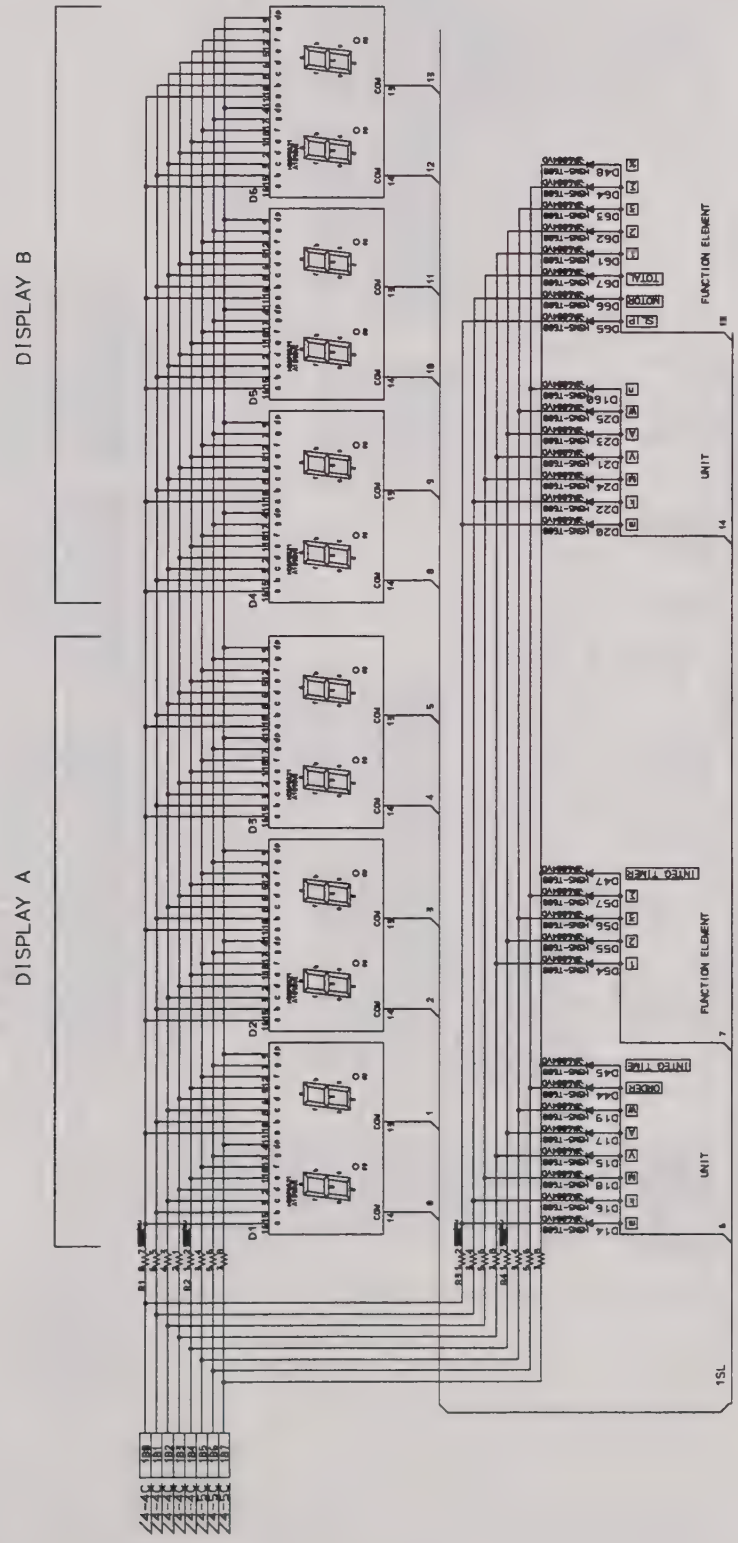

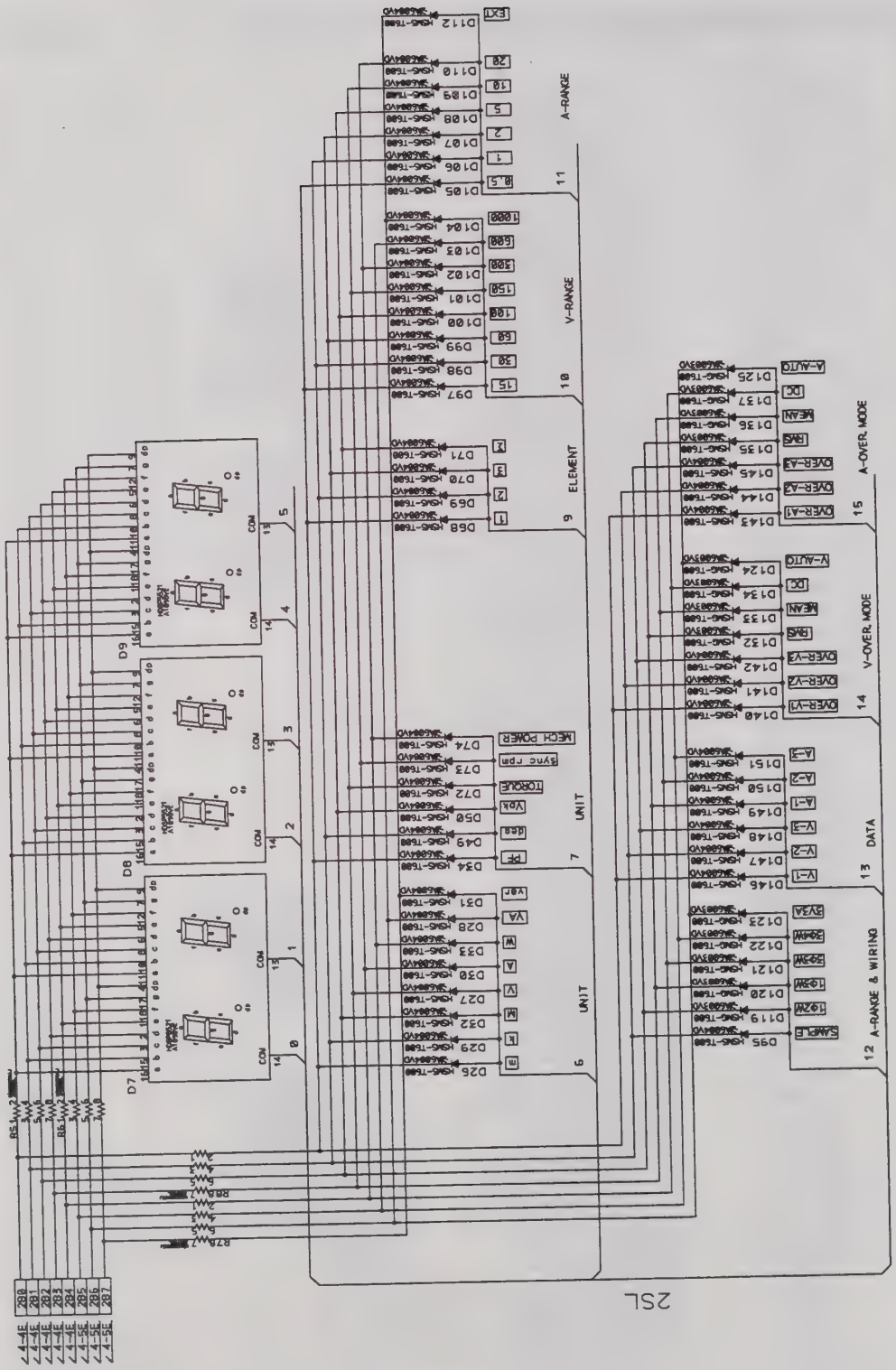
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V-RANGE
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UNIT
MECH POWER
A-OVER. MODE
V-OVER. MODE
DATA
A-RANGE & WIRING
2SL

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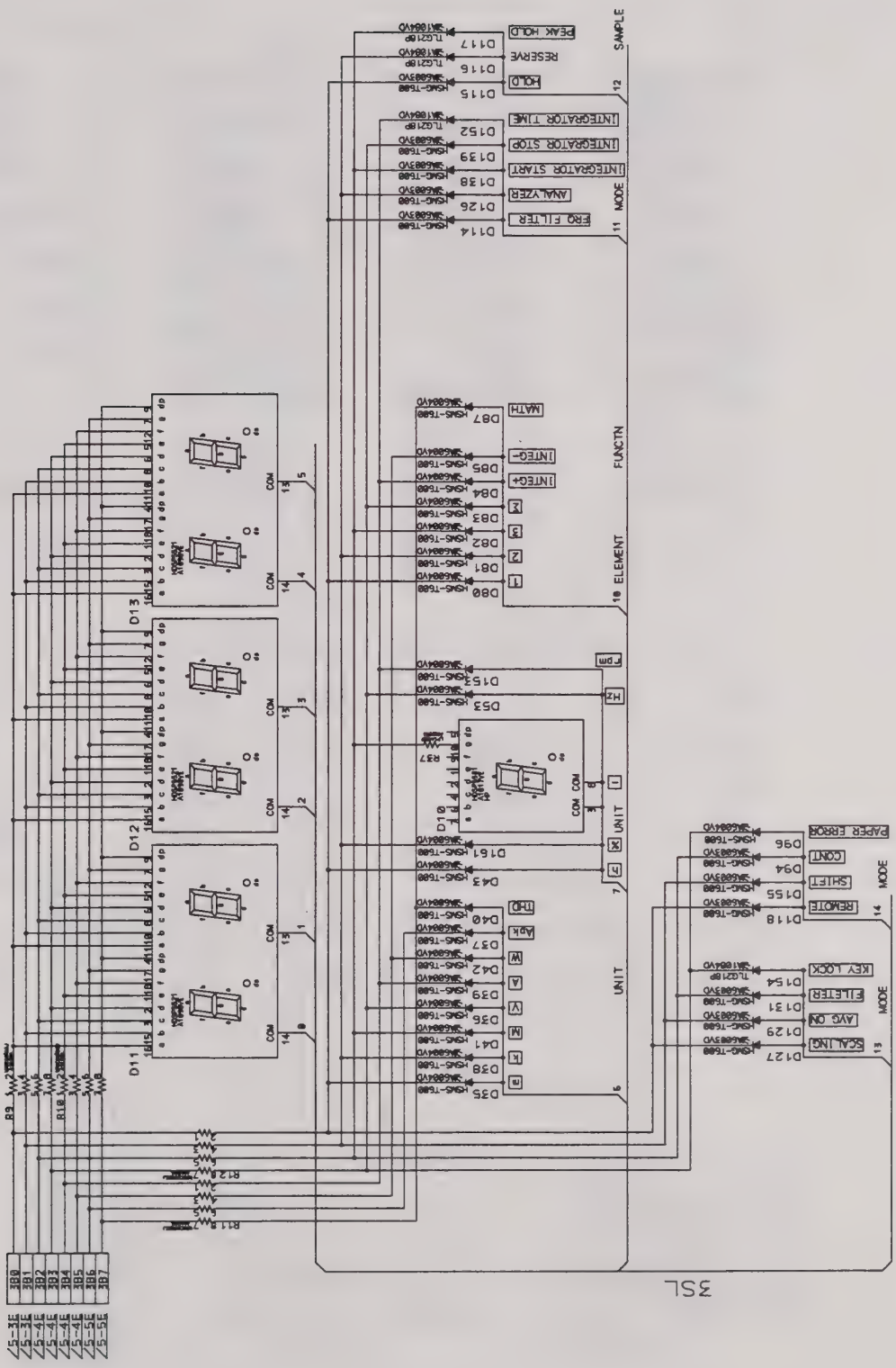
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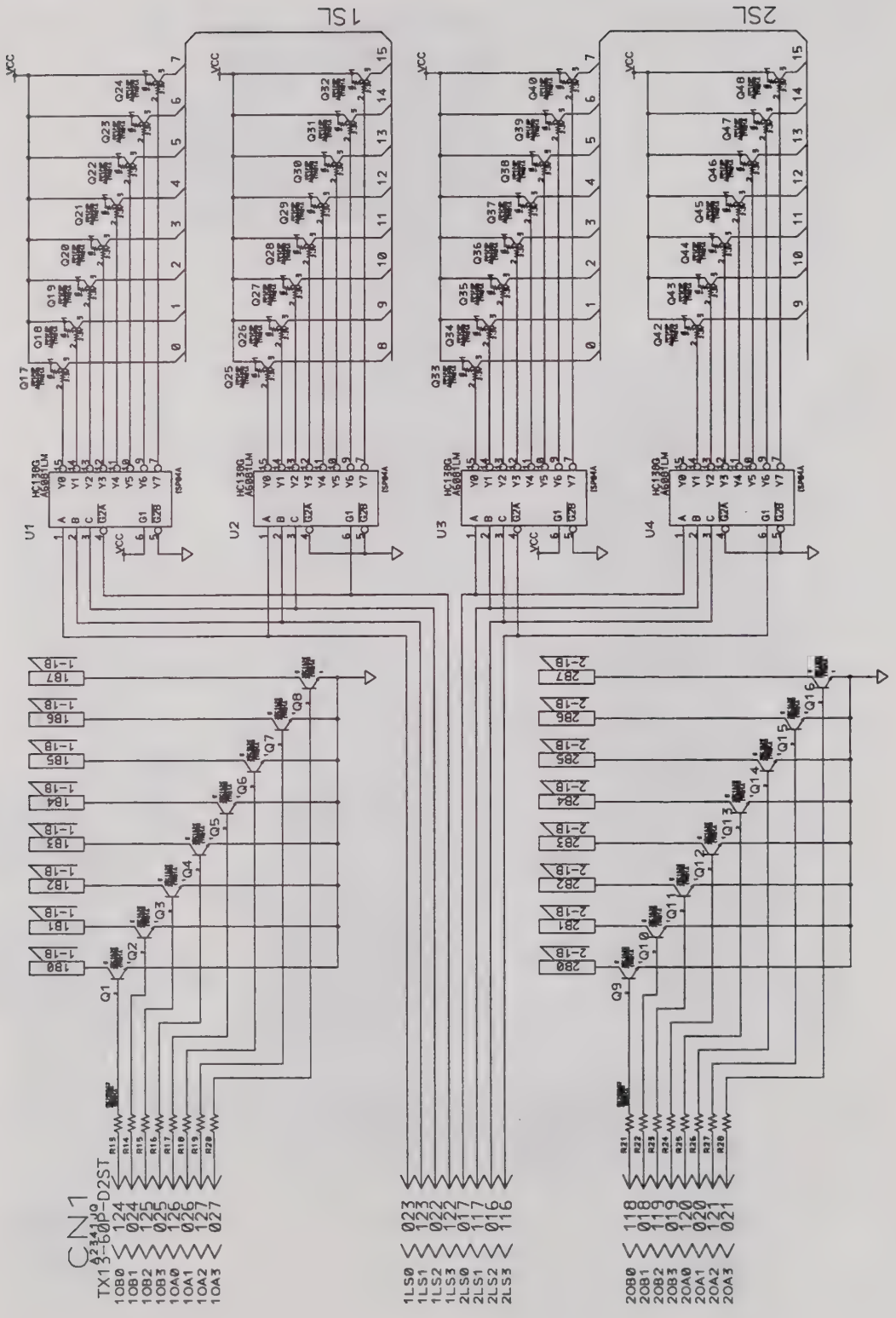
INTEGRATOR START
ANALYZER
FRQ FILTER
MODE
FUNCTN
MATH
INTEG-
INTEG+
ELEMENT
UNIT
PAPER ERROR
CONT
SHIFT
REMOTE
KEY LOCK
FILETER
AVG ON
SCALING
3SL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1LS2
1LS3
2LS0
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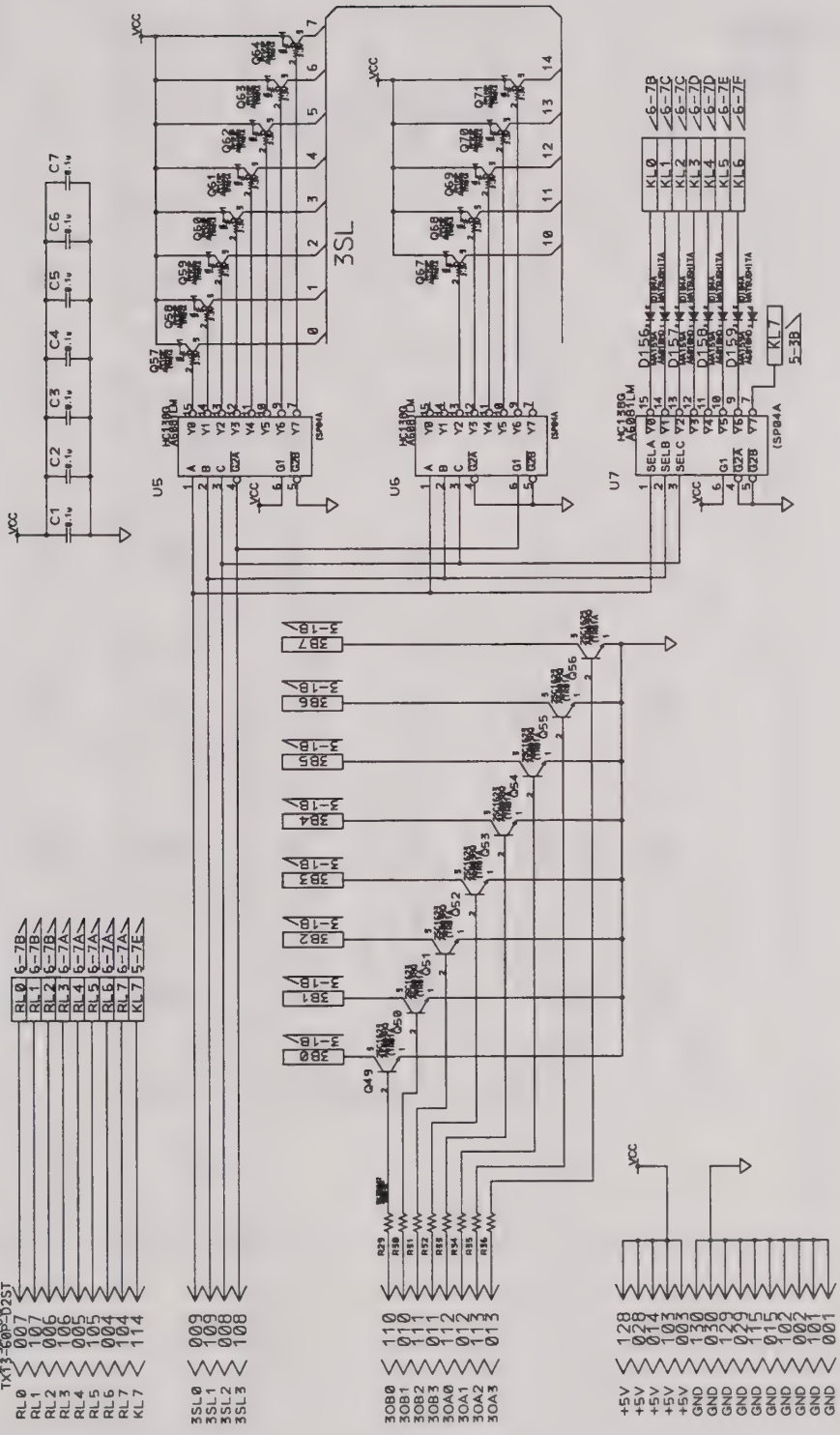
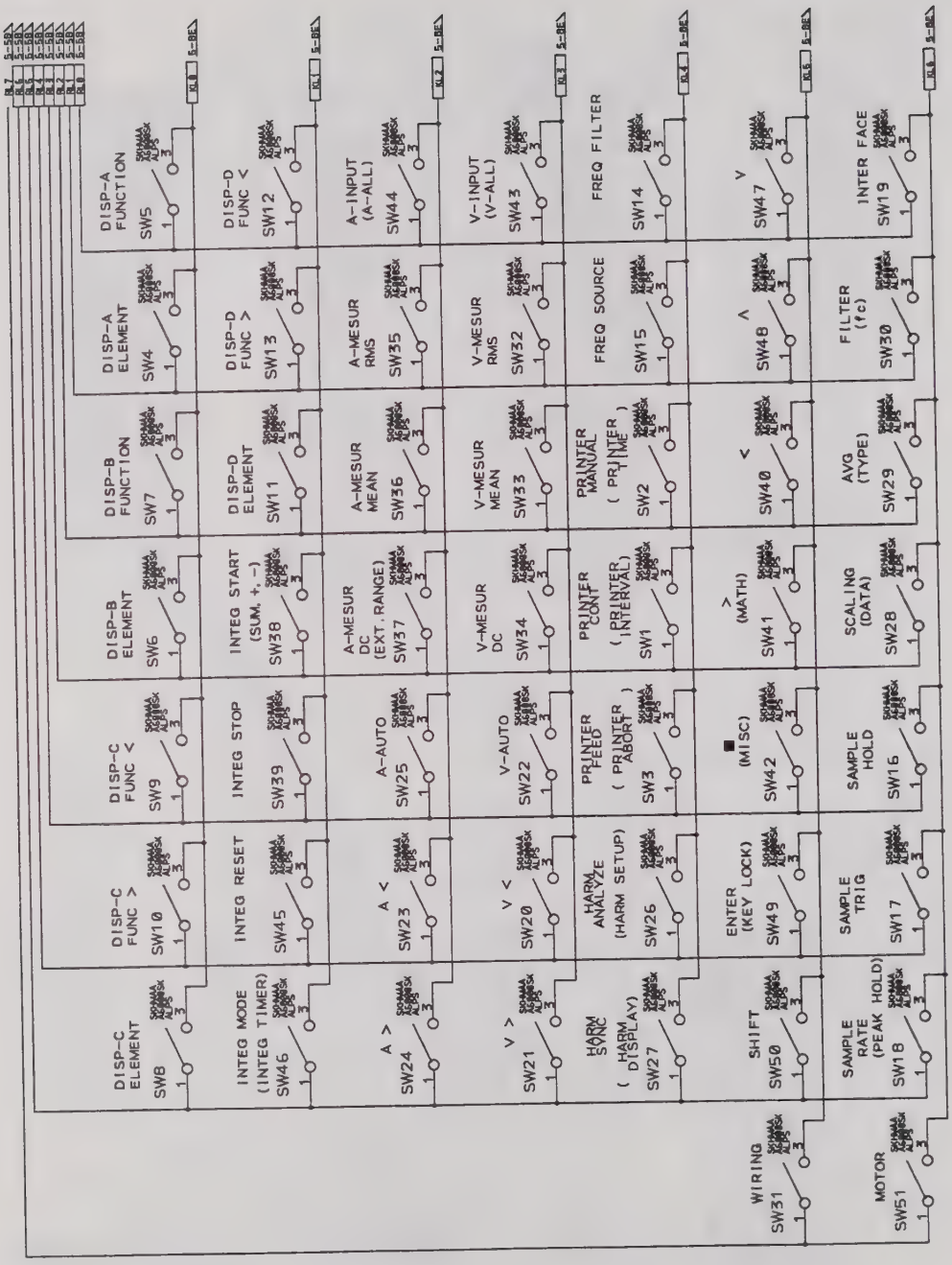
2OA2
2OA3

Page 5 of 6

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SW8
DISP-C FUNC >
SW10
DISP-C FUNC <
SW9
DISP-B ELEMENT
SW6
DISP-B FUNCTION
SW7
DISP-A ELEMENT
SW4
DISP-A FUNCTION
SW5
INTEG MODE (INTEG TIMER)
SW46
INTEG RESET
SW45
INTEG STOP
SW39
INTEG START (SUM, +, -)
SW38
DISP-D ELEMENT
SW11
DISP-D FUNC >
SW13
DISP-D FUNC <
SW12
A >
SW24
A <
SW23
A-AUTO
SW25
A-MESUR DC (EXT. RANGE)
SW37
A-MESUR MEAN
SW36
A-MESUR RMS
SW35
A-INPUT (A-ALL)
SW44
V >
SW21
V <
SW20
V-AUTO
SW22
V-MESUR DC
SW34
V-MESUR MEAN
SW33
V-MESUR RMS
SW32
V-INPUT (V-ALL)
SW43
HARM SYNC (HARM DISPLAY)
SW27
HARM ANALYZE (HARM SETUP)
SW26
PRINTER FEED (PRINTER ABORT)
SW3
PRINTER CONT (PRINTER INTERVAL)
SW1
PRINTER MANUAL (PRINTER TIME)
SW2
FREQ SOURCE
SW15
FREQ FILTER
SW14
WIRING
SW31
SHIFT
SW50
ENTER (KEY LOCK)
SW49
■ (MISC)
SW42
> (MATH)
SW41
<
SW40
A
SW48
V
SW47
MOTOR
SW51
SAMPLE RATE (PEAK HOLD)
SW18
SAMPLE TRIG
SW17
SAMPLE HOLD
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SCALING (DATA)
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AVG (TYPE)
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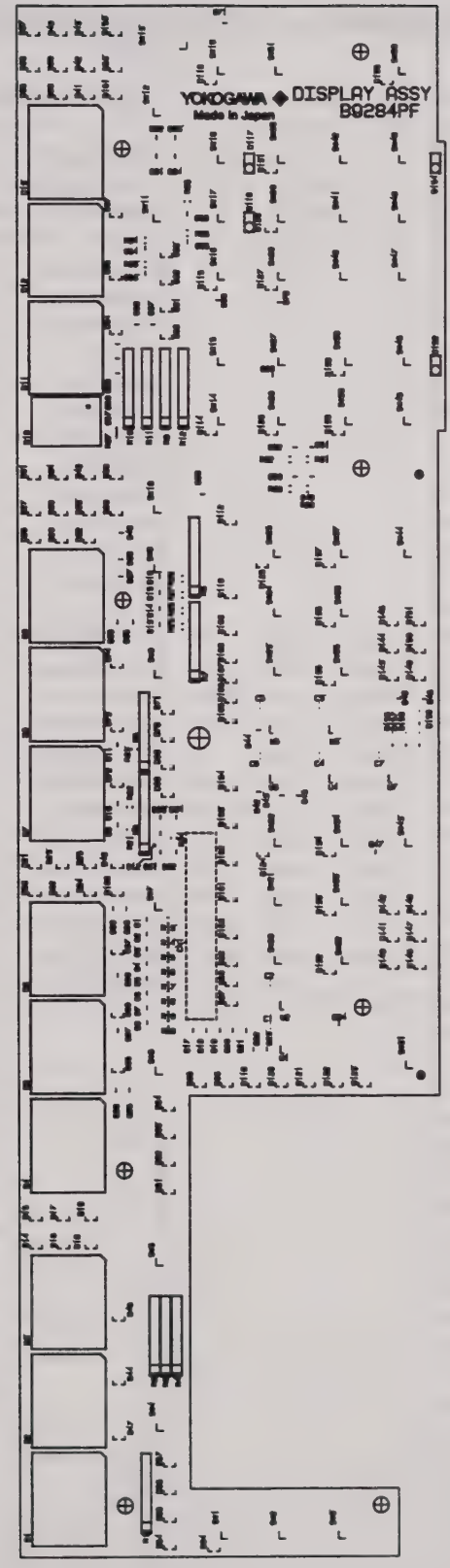
FILTER (fc)
SW30
INTER FACE
SW19

6.6.2 Location of Components



6.6.3 List of Electrical Parts (B9824PF)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	DISPLAY SMC ASSY		B9284RF	YOKOGAWA
CN1	1	POST TYPE CONN		TX13-60P-D2ST-NI	JAE
D1	1	LED MODULE		HDSP-5521	HP
D10	1	LED MODULE		HDSP-5501	HP
D11	1	LED MODULE		HDSP-5521	HP
D117	1	LED LAMP		TLG218P	TOSHIBA
D12	1	LED MODULE		HDSP-5521	HP
D13	1	LED MODULE		HDSP-5521	HP
D152	1	LED LAMP		TLG218P	TOSHIBA
D154	1	LED LAMP		TLG218P	TOSHIBA
D2	1	LED MODULE		HDSP-5521	HP
D3	1	LED MODULE		HDSP-5521	HP
D4	1	LED MODULE		HDSP-5521	HP
D5	1	LED MODULE		HDSP-5521	HP
D6	1	LED MODULE		HDSP-5521	HP
D7	1	LED MODULE		HDSP-5521	HP
D8	1	LED MODULE		HDSP-5521	HP
D9	1	LED MODULE		HDSP-5521	HP
R1	1	RES MODULE	68Ω ±5% W	EXB-F8V 680J	MATSUSHITA
R10	1	RES MODULE	68Ω ±5% W	EXB-F8V 680J	MATSUSHITA
R11	1	RES MODULE	33Ω ±5% 0.61W	EXB-F8V 330J	MATSUSHITA
R12	1	RES MODULE	33Ω ±5% 0.61W	EXB-F8V 330J	MATSUSHITA
R2	1	RES MODULE	68Ω ±5% W	EXB-F8V 680J	MATSUSHITA
R3	1	RES MODULE	33Ω ±5% 0.61W	EXB-F8V 330J	MATSUSHITA
R37	1	METAL FILM RES	33Ω ±1% 0.25W	LF1/4 330F	TAMA
R4	1	RES MODULE	33Ω ±5% 0.61W	EXB-F8V 330J	MATSUSHITA
R5	1	RES MODULE	68Ω ±5% W	EXB-F8V 680J	MATSUSHITA
R6	1	RES MODULE	68Ω ±5% W	EXB-F8V 680J	MATSUSHITA
R7	1	RES MODULE	33Ω ±5% 0.61W	EXB-F8V 330J	MATSUSHITA
R8	1	RES MODULE	33Ω ±5% 0.61W	EXB-F8V 330J	MATSUSHITA
R9	1	RES MODULE	68Ω ±5% W	EXB-F8V 680J	MATSUSHITA

List of Electrical Parts (B9824RF)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	DISPLAY PWB		B9284QF	YOKOGAWA
C1	1	CER CAPACITOR	0.1 μ F-20～80% 50V	C2012Y5V1H104Z*	TDK
C2	1	CER CAPACITOR	0.1 μ F-20～80% 50V	C2012Y5V1H104Z*	TDK
C3	1	CER CAPACITOR	0.1 μ F-20～80% 50V	C2012Y5V1H104Z*	TDK
C4	1	CER CAPACITOR	0.1 μ F-20～80% 50V	C2012Y5V1H104Z*	TDK
C5	1	CER CAPACITOR	0.1 μ F-20～80% 50V	C2012Y5V1H104Z*	TDK
C6	1	CER CAPACITOR	0.1 μ F-20～80% 50V	C2012Y5V1H104Z*	TDK
C7	1	CER CAPACITOR	0.1 μ F-20～80% 50V	C2012Y5V1H104Z*	TDK
D100	1	LED LAMP		HSMS-T600	HP
D101	1	LED LAMP		HSMS-T600	HP
D102	1	LED LAMP		HSMS-T600	HP
D103	1	LED LAMP		HSMS-T600	HP
D104	1	LED LAMP		HSMS-T600	HP
D105	1	LED LAMP		HSMS-T600	HP
D106	1	LED LAMP		HSMS-T600	HP
D107	1	LED LAMP		HSMS-T600	HP
D108	1	LED LAMP		HSMS-T600	HP
D109	1	LED LAMP		HSMS-T600	HP
D110	1	LED LAMP		HSMS-T600	HP
D112	1	LED LAMP		HSMS-T600	HP
D114	1	LED LAMP		HSMG-T600	HP
D115	1	LED LAMP		HSMG-T600	HP
D118	1	LED LAMP		HSMG-T600	HP
D119	1	LED LAMP		HSMG-T600	HP
D120	1	LED LAMP		HSMG-T600	HP
D121	1	LED LAMP		HSMG-T600	HP
D122	1	LED LAMP		HSMG-T600	HP
D123	1	LED LAMP		HSMG-T600	HP
D124	1	LED LAMP		HSMG-T600	HP
D125	1	LED LAMP		HSMG-T600	HP
D126	1	LED LAMP		HSMG-T600	HP
D127	1	LED LAMP		HSMG-T600	HP
D129	1	LED LAMP		HSMG-T600	HP
D131	1	LED LAMP		HSMG-T600	HP
D132	1	LED LAMP		HSMG-T600	HP
D133	1	LED LAMP		HSMG-T600	HP
D134	1	LED LAMP		HSMG-T600	HP
D135	1	LED LAMP		HSMG-T600	HP
D136	1	LED LAMP		HSMG-T600	HP
D137	1	LED LAMP		HSMG-T600	HP
D138	1	LED LAMP		HSMG-T600	HP
D139	1	LED LAMP		HSMG-T600	HP
D14	1	LED LAMP		HSMS-T600	HP
D140	1	LED LAMP		HSMS-T600	HP
D141	1	LED LAMP		HSMS-T600	HP
D142	1	LED LAMP		HSMS-T600	HP
D143	1	LED LAMP		HSMS-T600	HP
D144	1	LED LAMP		HSMS-T600	HP
D145	1	LED LAMP		HSMS-T600	HP
D146	1	LED LAMP		HSMS-T600	HP
D147	1	LED LAMP		HSMS-T600	HP
D148	1	LED LAMP		HSMS-T600	HP
D149	1	LED LAMP		HSMS-T600	HP

List of Electrical Parts (B9824RF) (Continued)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
D15	1	LED LAMP		HSMS-T600	HP
D150	1	LED LAMP		HSMS-T600	HP
D151	1	LED LAMP		HSMS-T600	HP
D153	1	LED LAMP		HSMS-T600	HP
D155	1	LED LAMP		HSMG-T600	HP
D156	1	DIODE		MA159A	MATSUSHITA
D157	1	DIODE		MA159A	MATSUSHITA
D158	1	DIODE		MA159A	MATSUSHITA
D159	1	DIODE		MA159A	MATSUSHITA
D16	1	LED LAMP		HSMS-T600	HP
D160	1	LED LAMP		HSMS-T600	HP
D161	1	LED LAMP		HSMS-T600	HP
D17	1	LED LAMP		HSMS-T600	HP
D18	1	LED LAMP		HSMS-T600	HP
D19	1	LED LAMP		HSMS-T600	HP
D20	1	LED LAMP		HSMS-T600	HP
D21	1	LED LAMP		HSMS-T600	HP
D22	1	LED LAMP		HSMS-T600	HP
D23	1	LED LAMP		HSMS-T600	HP
D24	1	LED LAMP		HSMS-T600	HP
D25	1	LED LAMP		HSMS-T600	HP
D26	1	LED LAMP		HSMS-T600	HP
D27	1	LED LAMP		HSMS-T600	HP
D28	1	LED LAMP		HSMS-T600	HP
D29	1	LED LAMP		HSMS-T600	HP
D30	1	LED LAMP		HSMS-T600	HP
D31	1	LED LAMP		HSMS-T600	HP
D32	1	LED LAMP		HSMS-T600	HP
D33	1	LED LAMP		HSMS-T600	HP
D34	1	LED LAMP		HSMS-T600	HP
D35	1	LED LAMP		HSMS-T600	HP
D36	1	LED LAMP		HSMS-T600	HP
D37	1	LED LAMP		HSMS-T600	HP
D38	1	LED LAMP		HSMS-T600	HP
D39	1	LED LAMP		HSMS-T600	HP
D40	1	LED LAMP		HSMS-T600	HP
D41	1	LED LAMP		HSMS-T600	HP
D42	1	LED LAMP		HSMS-T600	HP
D43	1	LED LAMP		HSMS-T600	HP
D44	1	LED LAMP		HSMS-T600	HP
D45	1	LED LAMP		HSMS-T600	HP
D47	1	LED LAMP		HSMS-T600	HP
D48	1	LED LAMP		HSMS-T600	HP
D49	1	LED LAMP		HSMS-T600	HP
D50	1	LED LAMP		HSMS-T600	HP
D53	1	LED LAMP		HSMS-T600	HP
D54	1	LED LAMP		HSMS-T600	HP
D55	1	LED LAMP		HSMS-T600	HP
D56	1	LED LAMP		HSMS-T600	HP
D57	1	LED LAMP		HSMS-T600	HP
D61	1	LED LAMP		HSMS-T600	HP
D62	1	LED LAMP		HSMS-T600	HP
D63	1	LED LAMP		HSMS-T600	HP
D64	1	LED LAMP		HSMS-T600	HP
D65	1	LED LAMP		HSMS-T600	HP
D66	1	LED LAMP		HSMS-T600	HP

List of Electrical Parts (B9824RF) (Continued)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
D67	1	LED LAMP		HSMS-T600	HP
D68	1	LED LAMP		HSMS-T600	HP
D69	1	LED LAMP		HSMS-T600	HP
D70	1	LED LAMP		HSMS-T600	HP
D71	1	LED LAMP		HSMS-T600	HP
D72	1	LED LAMP		HSMS-T600	HP
D73	1	LED LAMP		HSMS-T600	HP
D74	1	LED LAMP		HSMS-T600	HP
D80	1	LED LAMP		HSMS-T600	HP
D81	1	LED LAMP		HSMS-T600	HP
D82	1	LED LAMP		HSMS-T600	HP
D83	1	LED LAMP		HSMS-T600	HP
D84	1	LED LAMP		HSMS-T600	HP
D85	1	LED LAMP		HSMS-T600	HP
D87	1	LED LAMP		HSMS-T600	HP
D94	1	LED LAMP		HSMG-T600	HP
D95	1	LED LAMP		HSMS-T600	HP
D96	1	LED LAMP		HSMS-T600	HP
D97	1	LED LAMP		HSMS-T600	HP
D98	1	LED LAMP		HSMS-T600	HP
D99	1	LED LAMP		HSMS-T600	HP
Q1	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q10	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q11	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q12	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q13	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q14	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q15	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q16	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q17	1	TRANSISTOR		FP1F3P	NEC
Q18	1	TRANSISTOR		FP1F3P	NEC
Q19	1	TRANSISTOR		FP1F3P	NEC
Q2	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q20	1	TRANSISTOR		FP1F3P	NEC
Q21	1	TRANSISTOR		FP1F3P	NEC
Q22	1	TRANSISTOR		FP1F3P	NEC
Q23	1	TRANSISTOR		FP1F3P	NEC
Q24	1	TRANSISTOR		FP1F3P	NEC
Q25	1	TRANSISTOR		FP1F3P	NEC
Q26	1	TRANSISTOR		FP1F3P	NEC
Q27	1	TRANSISTOR		FP1F3P	NEC
Q28	1	TRANSISTOR		FP1F3P	NEC
Q29	1	TRANSISTOR		FP1F3P	NEC
Q3	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q30	1	TRANSISTOR		FP1F3P	NEC
Q31	1	TRANSISTOR		FP1F3P	NEC
Q32	1	TRANSISTOR		FP1F3P	NEC
Q33	1	TRANSISTOR		FP1F3P	NEC
Q34	1	TRANSISTOR		FP1F3P	NEC
Q35	1	TRANSISTOR		FP1F3P	NEC
Q36	1	TRANSISTOR		FP1F3P	NEC
Q37	1	TRANSISTOR		FP1F3P	NEC
Q38	1	TRANSISTOR		FP1F3P	NEC
Q39	1	TRANSISTOR		FP1F3P	NEC
Q4	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
Q40	1	TRANSISTOR		FP1F3P	NEC
Q42	1	TRANSISTOR		FP1F3P	NEC
43	1	TRANSISTOR		FP1F3P	NEC
Q44	1	TRANSISTOR		FP1F3P	NEC
Q45	1	TRANSISTOR		FP1F3P	NEC
Q46	1	TRANSISTOR		FP1F3P	NEC
Q47	1	TRANSISTOR		FP1F3P	NEC
Q48	1	TRANSISTOR		FP1F3P	NEC
Q49	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q5	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q50	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q51	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q52	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q53	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q54	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q55	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q56	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q57	1	TRANSISTOR		FP1F3P	NEC
Q58	1	TRANSISTOR		FP1F3P	NEC
Q59	1	TRANSISTOR		FP1F3P	NEC
Q6	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q60	1	TRANSISTOR		FP1F3P	NEC
Q61	1	TRANSISTOR		FP1F3P	NEC
Q62	1	TRANSISTOR		FP1F3P	NEC
Q63	1	TRANSISTOR		FP1F3P	NEC
Q64	1	TRANSISTOR		FP1F3P	NEC
Q67	1	TRANSISTOR		FP1F3P	NEC
Q68	1	TRANSISTOR		FP1F3P	NEC
Q69	1	TRANSISTOR		FP1F3P	NEC
Q7	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q70	1	TRANSISTOR		FP1F3P	NEC
Q71	1	TRANSISTOR		FP1F3P	NEC
Q8	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
Q9	1	TRANSISTOR		"2SC1623(M)-L5,L6,L7"	NEC
R13	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R14	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R15	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R16	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R17	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R18	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R19	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R20	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R21	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R22	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R23	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R24	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R25	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R26	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R27	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R28	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R29	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R30	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R31	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R32	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA

List of Electrical Parts (B9824RF) (Continued)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
R33	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R34	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R35	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
R36	1	METAL OXIDE RES	6.8kΩ ±1% 0.1W	ERJ6ENF6801*	MATSUSHITA
SW1	1	KEYBOARD SW		SKHMAA	ALPS
SW10	1	KEYBOARD SW		SKHMAA	ALPS
SW11	1	KEYBOARD SW		SKHMAA	ALPS
SW12	1	KEYBOARD SW		SKHMAA	ALPS
SW13	1	KEYBOARD SW		SKHMAA	ALPS
SW14	1	KEYBOARD SW		SKHMAA	ALPS
SW15	1	KEYBOARD SW		SKHMAA	ALPS
SW16	1	KEYBOARD SW		SKHMAA	ALPS
SW17	1	KEYBOARD SW		SKHMAA	ALPS
SW18	1	KEYBOARD SW		SKHMAA	ALPS
SW19	1	KEYBOARD SW		SKHMAA	ALPS
SW2	1	KEYBOARD SW		SKHMAA	ALPS
SW20	1	KEYBOARD SW		SKHMAA	ALPS
SW21	1	KEYBOARD SW		SKHMAA	ALPS
SW22	1	KEYBOARD SW		SKHMAA	ALPS
SW23	1	KEYBOARD SW		SKHMAA	ALPS
SW24	1	KEYBOARD SW		SKHMAA	ALPS
SW25	1	KEYBOARD SW		SKHMAA	ALPS
SW26	1	KEYBOARD SW		SKHMAA	ALPS
SW27	1	KEYBOARD SW		SKHMAA	ALPS
SW28	1	KEYBOARD SW		SKHMAA	ALPS
SW29	1	KEYBOARD SW		SKHMAA	ALPS
SW3	1	KEYBOARD SW		SKHMAA	ALPS
SW30	1	KEYBOARD SW		SKHMAA	ALPS
SW31	1	KEYBOARD SW		SKHMAA	ALPS
SW32	1	KEYBOARD SW		SKHMAA	ALPS
SW33	1	KEYBOARD SW		SKHMAA	ALPS
SW34	1	KEYBOARD SW		SKHMAA	ALPS
SW35	1	KEYBOARD SW		SKHMAA	ALPS
SW36	1	KEYBOARD SW		SKHMAA	ALPS
SW37	1	KEYBOARD SW		SKHMAA	ALPS
SW38	1	KEYBOARD SW		SKHMAA	ALPS
SW39	1	KEYBOARD SW		SKHMAA	ALPS
SW4	1	KEYBOARD SW		SKHMAA	ALPS
SW40	1	KEYBOARD SW		SKHMAA	ALPS
SW41	1	KEYBOARD SW		SKHMAA	ALPS
SW42	1	KEYBOARD SW		SKHMAA	ALPS
SW43	1	KEYBOARD SW		SKHMAA	ALPS
SW44	1	KEYBOARD SW		SKHMAA	ALPS
SW45	1	KEYBOARD SW		SKHMAA	ALPS
SW46	1	KEYBOARD SW		SKHMAA	ALPS
SW47	1	KEYBOARD SW		SKHMAA	ALPS
SW48	1	KEYBOARD SW		SKHMAA	ALPS
SW49	1	KEYBOARD SW		SKHMAA	ALPS
SW5	1	KEYBOARD SW		SKHMAA	ALPS
SW50	1	KEYBOARD SW		SKHMAA	ALPS
SW51	1	KEYBOARD SW		SKHMAA	ALPS
SW6	1	KEYBOARD SW		SKHMAA	ALPS
SW7	1	KEYBOARD SW		SKHMAA	ALPS
SW8	1	KEYBOARD SW		SKHMAA	ALPS
SW9	1	KEYBOARD SW		SKHMAA	ALPS

List of Electrical Parts (B9824RF) (Continued)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
U1	1	CMOS LOGIC		MN74HC138S	MATSUSHITA
U2	1	CMOS LOGIC		MN74HC138S	MATSUSHITA
U3	1	CMOS LOGIC		MN74HC138S	MATSUSHITA
U4	1	CMOS LOGIC		MN74HC138S	MATSUSHITA
U5	1	CMOS LOGIC		MN74HC138S	MATSUSHITA
U6	1	CMOS LOGIC		MN74HC138S	MATSUSHITA
U7	1	CMOS LOGIC		MN74HC138S	MATSUSHITA

6.7 DC Power Assembly (B9284PH)

6.7.1 Schematic Diagram

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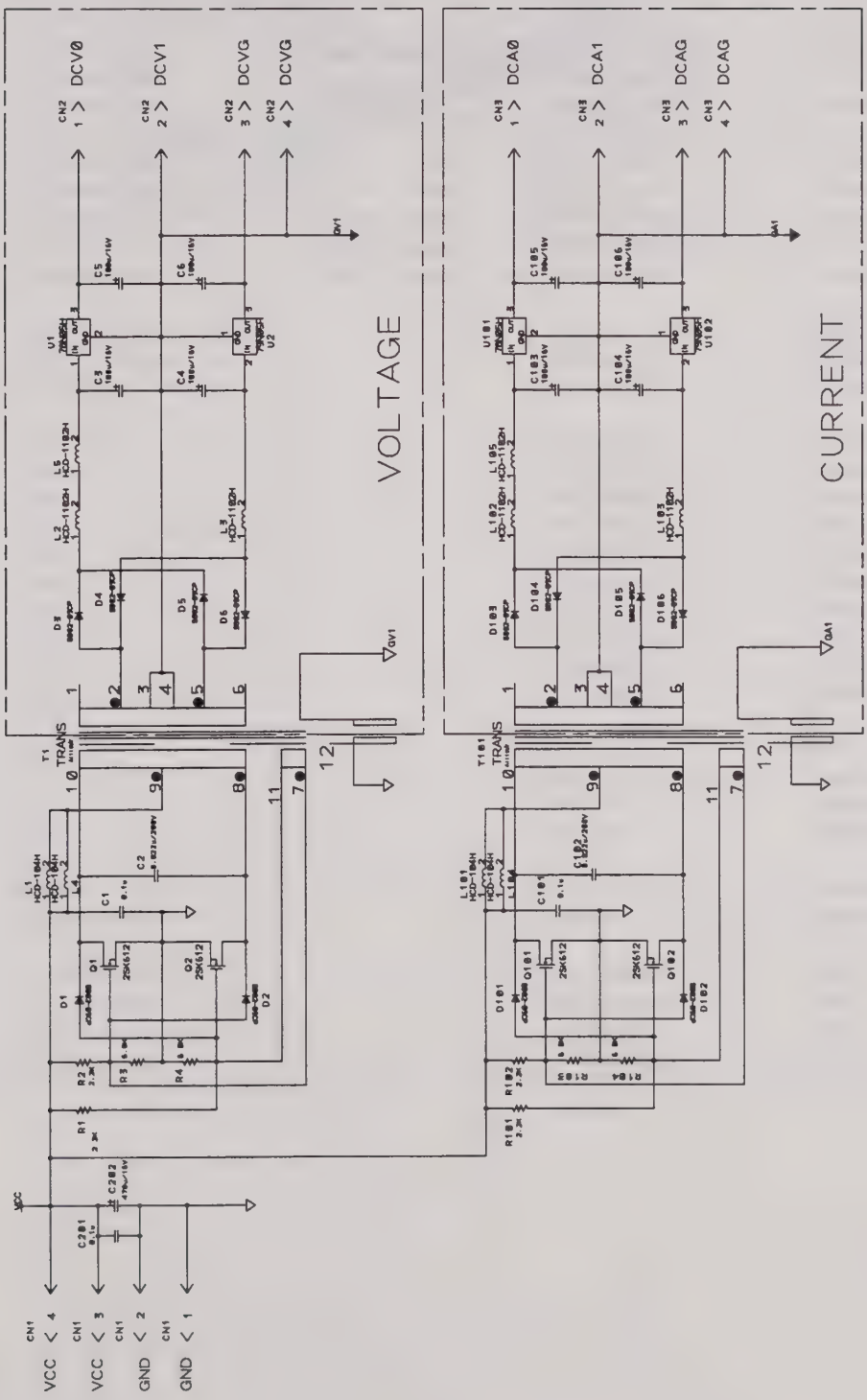
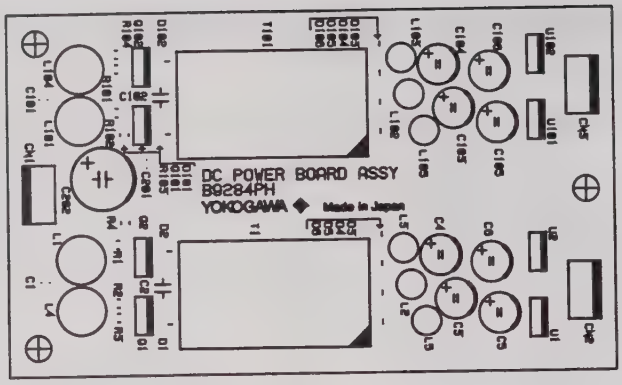


6.7.2 Location of Components



6.7.3 List of Electrical Parts (B9284PH)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	DC POWER SMC ASSY		B9284RH	YOKOGAWA
C102	1	FILM CAPACITOR	22000pF ±10% 200V	501N2003223K1	MATSUO
C103	1	ALUMINUM CAP	100μF ±25% 16V	KME16VB100	NITSUCHEMI
C104	1	ALUMINUM CAP	100μF ±25% 16V	KME16VB100	NITSUCHEMI
C105	1	ALUMINUM CAP	100μF ±25% 16V	KME16VB100	NITSUCHEMI
C106	1	ALUMINUM CAP	100μF ±25% 16V	KME16VB100	NITSUCHEMI
C2	1	FILM CAPACITOR	22000pF ±10% 200V	501N2003223K1	MATSUO
C202	1	ALUMINUM CAP	470μF ±20% 16V	KME16VB470	NITSUCHEMI
C3	1	ALUMINUM CAP	100μF ±25% 16V	KME16VB100	NITSUCHEMI
C4	1	ALUMINUM CAP	100μF ±25% 6V	KME16VB100	NITSUCHEMI
C5	1	ALUMINUM CAP	100μF ±25% 16V	KME16VB100	NITSUCHEMI
C6	1	ALUMINUM CAP	100μF ±25% 16V	KME16VB100	NITSUCHEMI
CN1	1	POST TYPE CONN		5045-04A	MOLEX
CN2	1	POST TYPE CONN		5045-04A	MOLEX
CN3	1	POST TYPE CONN		5045-04A	MOLEX
L1	1	COIL		HCD-104H	HOKKOU ELE
L101	1	COIL		HCD-104H	HOKKOU ELE
L102	1	COIL		HCD-1681H	HOKKOU ELE
L103	1	COIL		HCD-1681H	HOKKOU ELE
L104	1	COIL		HCD-104H	HOKKOU ELE
L105	1	COIL		HCD-1681H	HOKKOU ELE
L2	1	COIL		HCD-1681H	HOKKOU ELE
L3	1	COIL		HCD-1681H	HOKKOU ELE
L4	1	COIL		HCD-104H	HOKKOU ELE
L5	1	COIL		HCD-1681H	HOKKOU ELE
Q1	1	FET		2SK1113	TOSHIBA
Q101	1	FET		2SK1113	TOSHIBA
Q102	1	FET		2SK1113	TOSHIBA
Q2	1	FET		2SK1113	TOSHIBA
T1	1	TRANSFORMER		DD221B	SANKEN
T101	1	TRANSFORMER		DD221B	SANKEN
U1	1	VOLTAGE RGLTR		UPC78N05H	NEC
U101	1	VOLTAGE RGLTR		UPC78N05H	NEC
U102	1	VOLTAGE RGLTR		UPC79N05H	NEC
U2	1	VOLTAGE RGLTR		UPC79N05H	NEC

List of Electrical Parts (B9284RH)

Item	Q'ty	Part Name	Description			MFR Part Name	MFR Name
1	1	DC POWER PWB				B9284QH	YOKOGAWA
C1	1	CER CAPACITOR	0.1 μ F-20～80%		50V	C2012Y5V1H104Z*	TDK
C101	1	CER CAPACITOR	0.1 μ F-20～80%		50V	C2012Y5V1H104Z*	TDK
C201	1	CER CAPACITOR	0.1 μ F-20～80%		50V	C2012Y5V1H104Z*	TDK
D1	1	DIODE				SB02-09CP-TB	SANYO
D101	1	DIODE				SB02-09CP-TB	SANYO
D102	1	DIODE				SB02-09CP-TB	SANYO
D103	1	DIODE				SB02-09CP-TB	SANYO
D104	1	DIODE				SB02-09CP-TB	SANYO
D105	1	DIODE				SB02-09CP-TB	SANYO
D106	1	DIODE				SB02-09CP-TB	SANYO
D2	1	DIODE				SB02-09CP-TB	SANYO
D3	1	DIODE				SB02-09CP-TB	SANYO
D4	1	DIODE				SB02-09CP-TB	SANYO
D5	1	DIODE				SB02-09CP-TB	SANYO
D6	1	DIODE				SB02-09CP-TB	SANYO
R1	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R101	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R102	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R103	1	METAL OXIDE RES	6.8kΩ	±1%	0.1W	ERJ6ENF6801*	MATSUSHITA
R104	1	METAL OXIDE RES	6.8kΩ	±1%	0.1W	ERJ6ENF6801*	MATSUSHITA
R2	1	METAL OXIDE RES	2.2kΩ	±1%	0.1W	ERJ6ENF2201*	MATSUSHITA
R3	1	METAL OXIDE RES	6.8kΩ	±1%	0.1W	ERJ6ENF6801*	MATSUSHITA
R4	1	METAL OXIDE RES	6.8kΩ	±1%	0.1W	ERJ6ENF6801*	MATSUSHITA

6.8 GP-IB/RS-232-C/HRM Board Assembly (B9284PL, B9284PM, B9284PP, B9284PQ)

6.8.1 Schematic Diagrams

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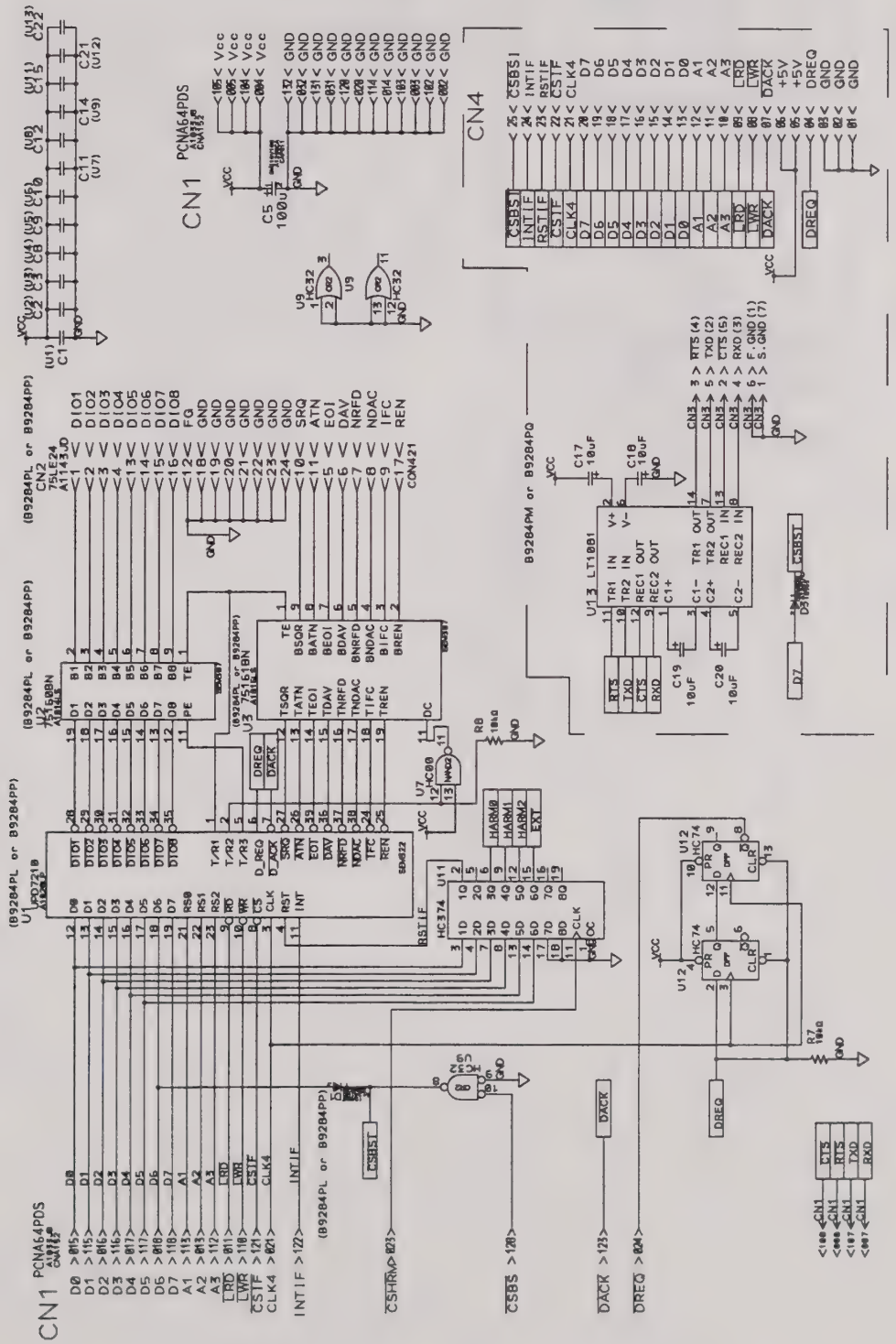
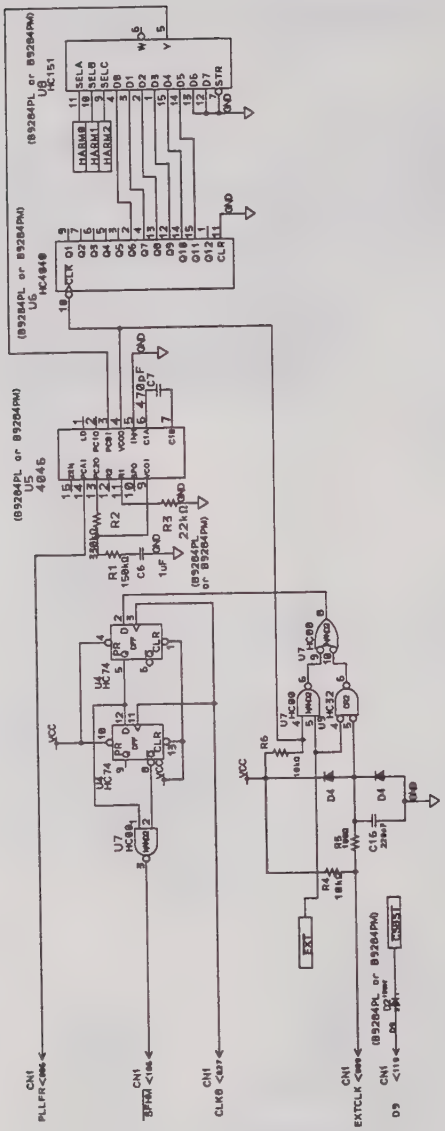
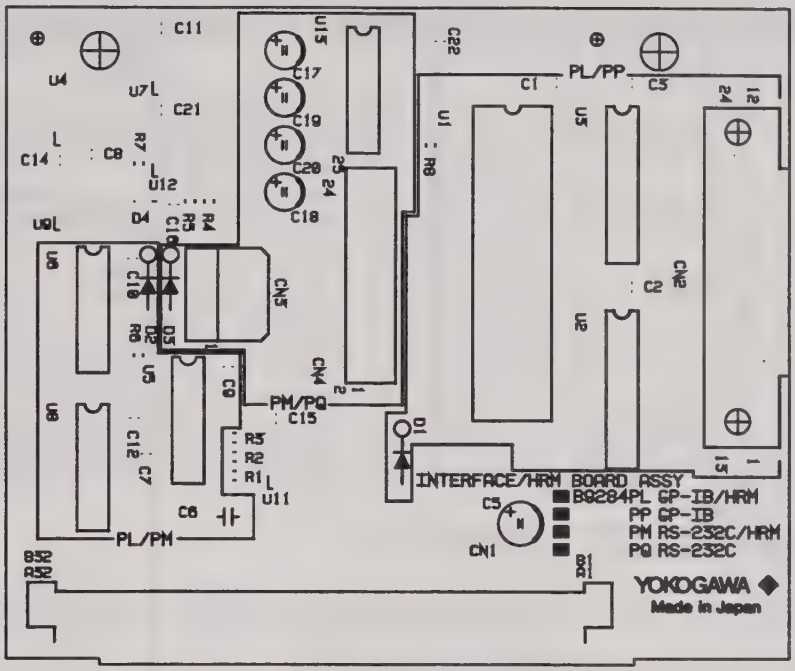




6.8.2 Location of Components



6.8.3 List of Electrical Parts (B9284PL, PP)

Item	Q'ty		Part Name	Description	MFR Part Name	MFR Name
1	1	1	INTERFACE SMC ASSY		B9284RL	YOKOGAWA
2	2	2	SCREW MACHINE		Y9308LS	YOKOGAWA
C5	1	1	ALUMINUM CAP	100 μF ±20% 16V	ECEA1CU101	MATSUSHITA
C6	1		FILM CAP	1 μF ±10% 50V	SMC-E105J63	SIZUKI
CN1	1	1	BOARD CONN		PCN10A-64P-2.54DS	HIROSE
CN2	1	1	CABLE CONN		57LE-20240-770RD35G	DDK
D1	1	1	DIODE		1S1588	TOSHIBA
D2	1		DIODE		1S1588	TOSHIBA
U1	1	1	MPU & PRPHL		UPD7210C	NEC
U2	1	1	TTL		HD75160AP	HITACHI
U3	1	1	TTL		HD75161AP	HITACHI
U5	1		CMOS LOGIC		CD4046AE	RCA
U6	1		CMOS LOGIC		MC74HC4040AN	MOTOROLA
U8	1		CMOS LOGIC		MC74HC151N	MOTOROLA

Assy. Parts No.	B9284PL	B9284PP	B9284PL for Model 2536** -C1 /HRM B9284PP for Model 2536** -C1

6.8.4 List of Electrical Parts (B9284PM, PQ)

Item	Q'ty		Part Name	Description	MFR Part Name	MFR Name
1	1	1	INTERFACE SMC ASSY		B9284RL	YOKOGAWA
2	1	1	BRACKET		B9314CL	YOKOGAWA
3	2	2	SCREW MACHINE		Y9305LS	YOKOGAWA
C17	1	1	ALUMINUM CAP	10 μF ±20% 16V	ECEA1CU100	MATSUSHITA
C18	1	1	ALUMINUM CAP	10 μF ±20% 16V	ECEA1CU100	MATSUSHITA
C19	1	1	ALUMINUM CAP	10 μF ±20% 16V	ECEA1CU100	MATSUSHITA
C20	1	1	ALUMINUM CAP	10 μF ±20% 16V	ECEA1CU100	MATSUSHITA
C5	1	1	ALUMINUM CAP	100 μF ±20% 16V	ECEA1CU101	MATSUSHITA
C6	1	1	FILM CAP	1 μF ±10% 16V	SMC-E105J63	SIZUKI
CN1	1	1	BOARD CONN		PCN10A-64P-2.54DS	HIROSE
CN3	1	1	POST TYPE CONN		5046-06A	MOLEX
CN4	1	1	POST TYPE CONN		HLEM25R-1	BURNDY
D2	1		DIODE		1S1588	TOSHIBA
D3	1	1	DIODE		1S1588	TOSHIBA
U13	1	1	MPU & PRPHL		LT1081CN	LINEARTECH
U5	1		CMOS LOGIC		CD4046AE	RCA
U6	1		CMOS LOGIC		MC74HC4040AN	MOTOROLA
U8	1		CMOS LOGIC		MC74HC151N	MOTOROLA

Assy. Parts No.	B9824PM	B9824PQ	B9824PM for Model 2536** C2 /HRM B9824PQ for Model 2536** C2

List of Electrical Parts (B9284RL)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	INTERFACE PWB		B9284QL	YOKOGAWA
C1	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C10	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C11	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C12	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C14	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C15	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C16	1	CERAMIC CAP	220pF ±5% 50V	C2012CH1H221J*	TDK
C2	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C21	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C22	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C3	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C7	1	CERAMIC CAP	470pF ±5% 50V	C2012CH1H471J*	TDK
C8	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C9	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
D4	1	DIODE		MA159A	MATSUSHITA
R1	1	METAL OXIDE RES	150kΩ ±1% 0.1W	ERJ6ENF1503*	MATSUSHITA
R2	1	METAL OXIDE RES	330kΩ ±1% 0.1W	ERJ6ENF3303*	MATSUSHITA
R3	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R4	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R5	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R6	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R7	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R8	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
U11	1	CMOS LOGIC		TC74HC374AF	TOSHIBA
U12	1	CMOS LOGIC		TC74HC74AF	TOSHIBA
U4	1	CMOS LOGIC		TC74HC74AF	TOSHIBA
U7	1	CMOS LOGIC		TC74HC00AF	TOSHIBA
U9	1	CMOS LOGIC		TC74HC32AF	TOSHIBA

6.9 Waveform Board Assembly (B9284PS)

6. 9.1 Schematic Diagrams

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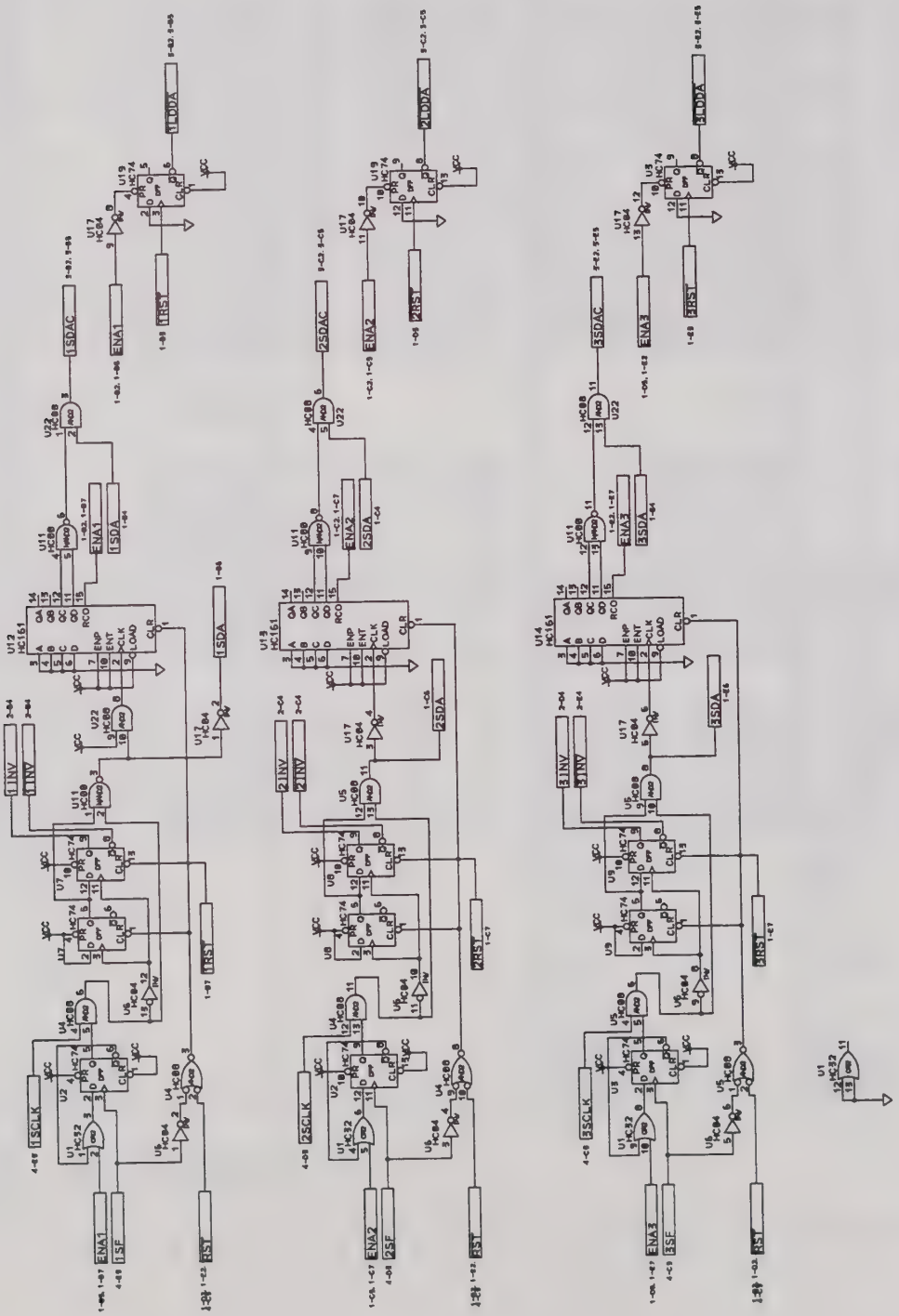

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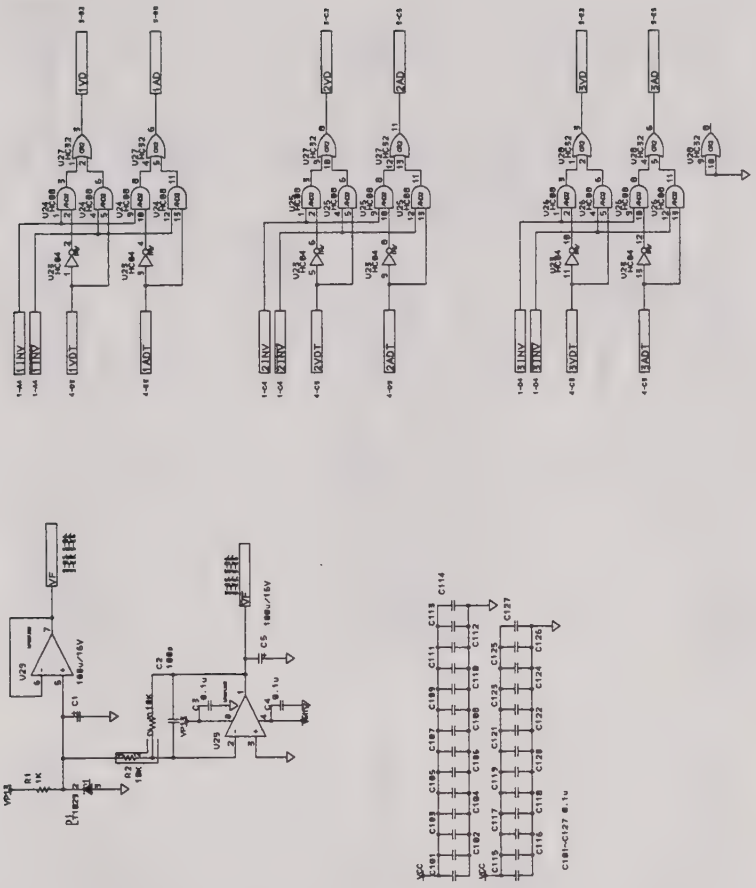

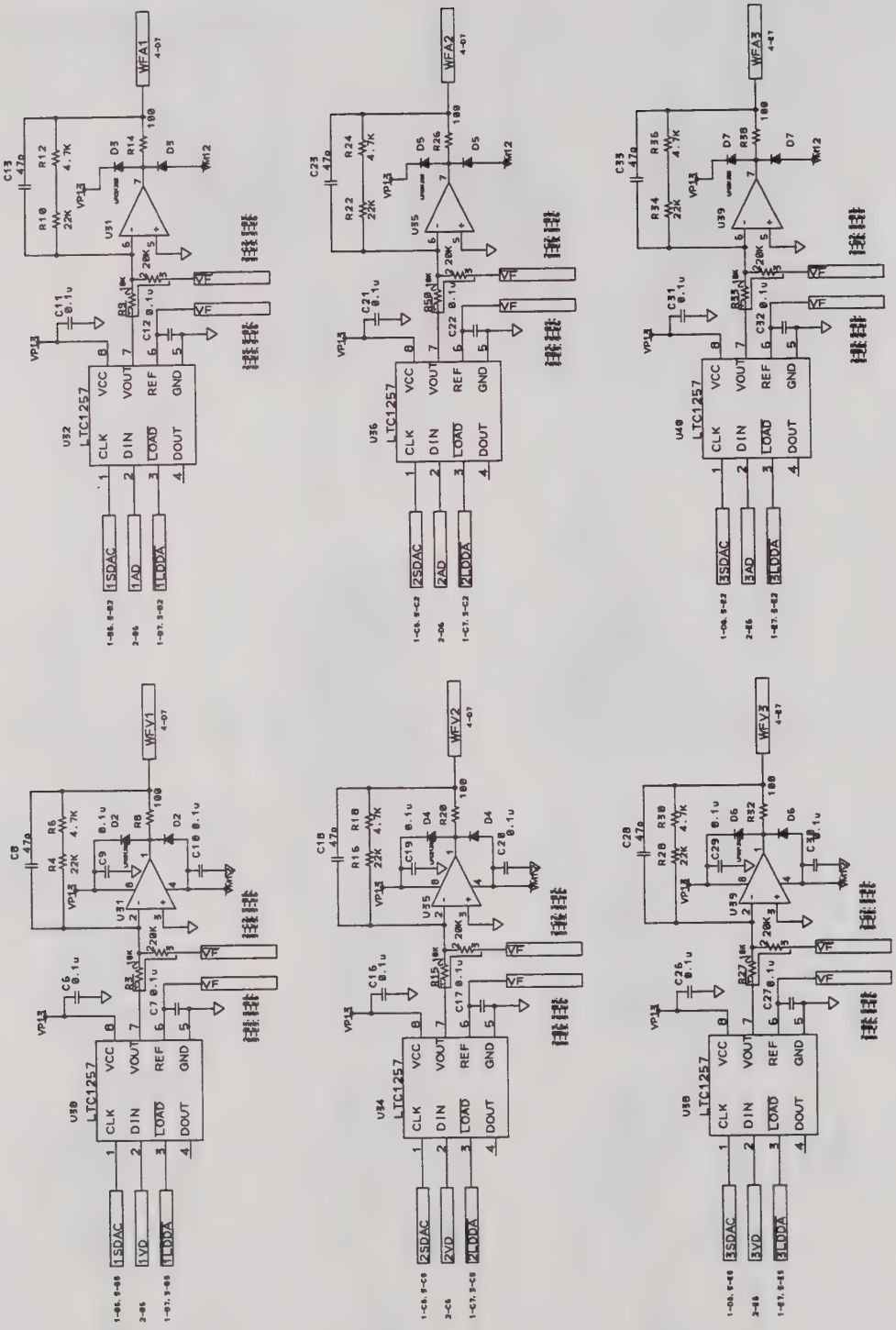
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WFA3
WFV1
WFV2
WFV3
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LOAD
DOUT
VCC
VOUT
REF
GND
1SDAC
1AD
1LDDA
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2AD
2LDDA
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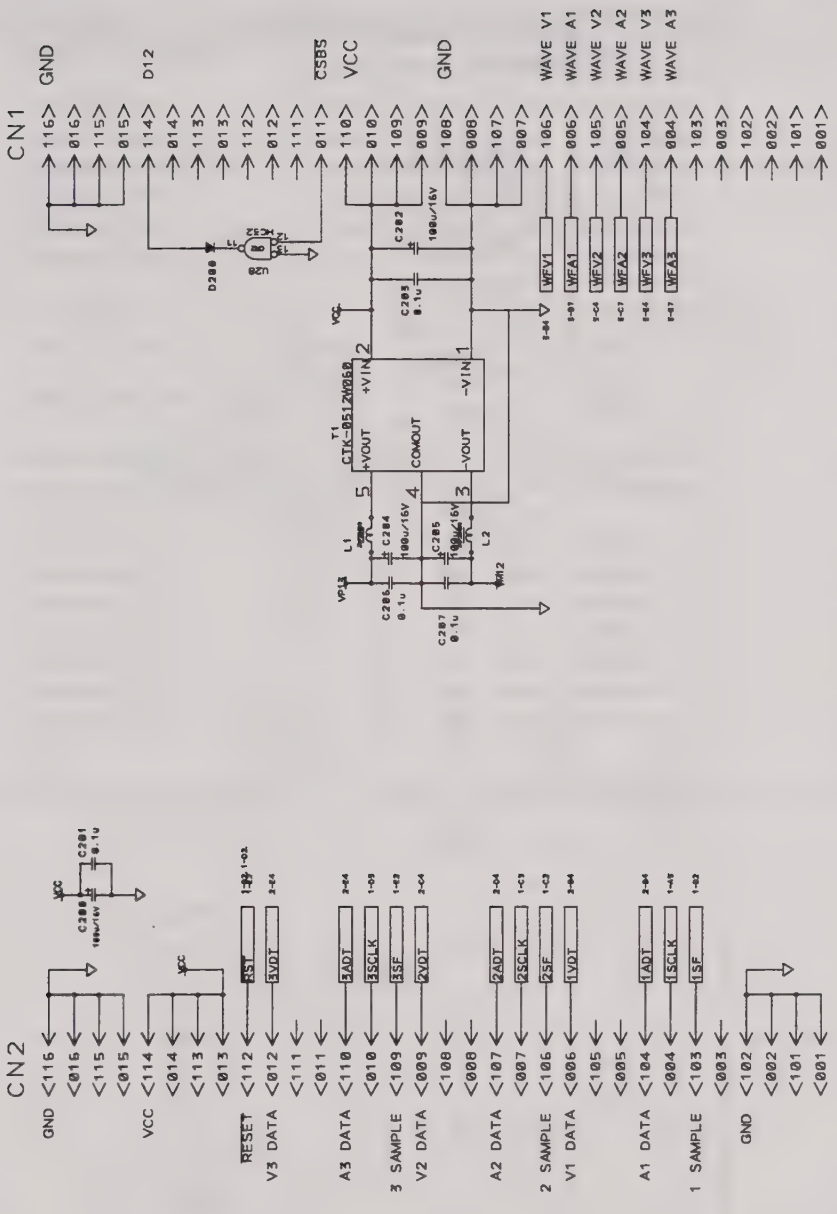
3AD
3LDDA
1VD
2VD
3VD
VF
VP13

Page 4 of 4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D12
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VCC
GND
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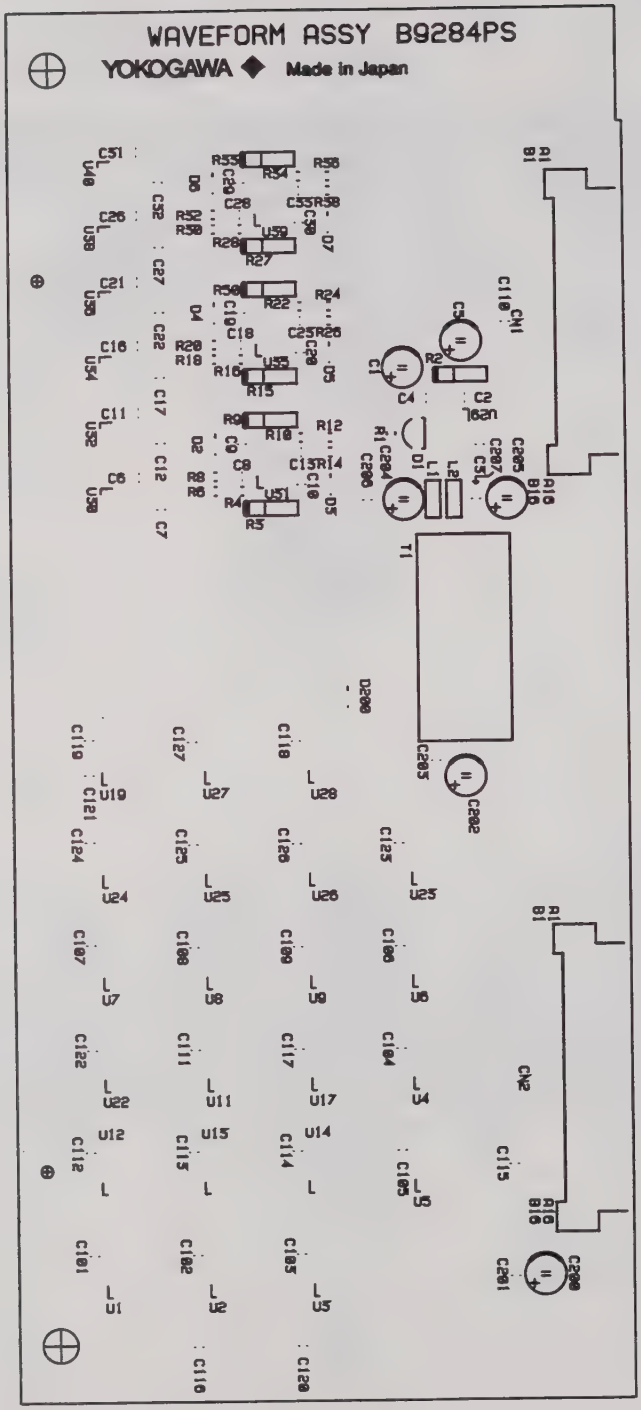
WAVE A1
WAVE V2
WAVE A2
WAVE V3
WAVE A3
CN2
GND
VCC
RESET
V3 DATA
A3 DATA
3 SAMPLE
V2 DATA
A2 DATA
2 SAMPLE
V1 DATA
A1 DATA
1 SAMPLE
GND


WAVEFORM ASSY B9284PS
YOKOGAWA ◆ Made in Japan
CN1
CN2
T1

6.9.3 List of Electrical Parts (B9824PS)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	WAVEFORM SMC ASSY		B9284RS	YOKOGAWA
C1	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C200	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C202	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C204	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C205	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
C5	1	ALUMINUM CAP	100 μF ±25% 16V	KME16VB100	NITSUCHEMI
CN1	1	BOARD CONN		PCN10A-32P-2.54DS	HIROSE
CN2	1	BOARD CONN		PCN10A-32P-2.54DS	HIROSE
D1	1	VOLTAGE RGLTR		LT1029CZ	LINEARTECH
L1	1	MAGNETIC PART		ZBF253D-00	TDK
L2	1	MAGNETIC PART		ZBF253D-00	TDK
R15	1	RES MODULE	2* MF 0.2W	MRP2309	TAMA
R2	1	RES MODULE	2* MF 0.2W	MRP2308	TAMA
R27	1	RES MODULE	2* MF 0.2W	MRP2309	TAMA
R3	1	RES MODULE	2* MF 0.2W	MRP2309	TAMA
R33	1	RES MODULE	2* MF 0.2W	MRP2309	TAMA
R50	1	RES MODULE	2* MF 0.2W	MRP2309	TAMA
R9	1	RES MODULE	2* MF 0.2W	MRP2309	TAMA
T1	1	DC/DC		CTK-0512W060	SANYU

List of Electrical Parts (B9824RS)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	WAVEFORM PWB		B9284QS	YOKOGAWA
C10	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C101	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C102	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C103	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C104	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C105	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C106	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C107	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C108	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C109	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C11	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C110	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C111	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C112	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C113	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C114	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C115	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C116	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C117	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C118	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C119	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C12	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C120	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C121	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C122	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C123	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C124	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
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C126	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C127	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C13	1	CER CAPACITOR	47pF ±5% 50V	C2012CH1H470J*	TDK
C16	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C17	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C18	1	CER CAPACITOR	47pF ±5% 50V	C2012CH1H470J*	TDK
C19	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C2	1	CERAMIC CAP	100pF ±5% 50V	C2012CH1H101J*	TDK
C20	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C201	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C203	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C206	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C207	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C21	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C22	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C23	1	CER CAPACITOR	47pF ±5% 50V	C2012CH1H470J*	TDK
C26	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C27	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C28	1	CER CAPACITOR	47pF ±5% 50V	C2012CH1H470J*	TDK
C29	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C3	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C30	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C31	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C32	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C33	1	CER CAPACITOR	47pF ±5% 50V	C2012CH1H470J*	TDK

List of Electrical Parts (B9824RS) Continued

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
C4	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C6	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C7	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C8	1	CER CAPACITOR	47pF ±5% 50V	C2012CH1H470J*	TDK
C9	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
D2	1	DIODE		MA159A	MATSUSHITA
D200	1	DIODE		MA159A	MATSUSHITA
D3	1	DIODE		MA159A	MATSUSHITA
D4	1	DIODE		MA159A	MATSUSHITA
D5	1	DIODE		MA159A	MATSUSHITA
D6	1	DIODE		MA159A	MATSUSHITA
D7	1	DIODE		MA159A	MATSUSHITA
R1	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R10	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R12	1	METAL OXIDE RES	4.7kΩ ±1% 0.1W	ERJ6ENF4701*	MATSUSHITA
R14	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R16	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R18	1	METAL OXIDE RES	4.7kΩ ±1% 0.1W	ERJ6ENF4701*	MATSUSHITA
R20	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R22	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R24	1	METAL OXIDE RES	4.7kΩ ±1% 0.1W	ERJ6ENF4701*	MATSUSHITA
R26	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R28	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R30	1	METAL OXIDE RES	4.7kΩ ±1% 0.1W	ERJ6ENF4701*	MATSUSHITA
R32	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R34	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R36	1	METAL OXIDE RES	4.7kΩ ±1% 0.1W	ERJ6ENF4701*	MATSUSHITA
R38	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R4	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA
R6	1	METAL OXIDE RES	4.7kΩ ±1% 0.1W	ERJ6ENF4701*	MATSUSHITA
R8	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
U1	1	CMOS LOGIC		TC74HC32AF	TOSHIBA
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U13	1	CMOS LOGIC		TC74HC161AF	TOSHIBA
U14	1	CMOS LOGIC		TC74HC161AF	TOSHIBA
U17	1	CMOS LOGIC		TC74HC04AF	TOSHIBA
U19	1	CMOS LOGIC		TC74HC74AF	TOSHIBA
U2	1	CMOS LOGIC		TC74HC74AF	TOSHIBA
U22	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U23	1	CMOS LOGIC		TC74HC04AF	TOSHIBA
U24	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U25	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U26	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U27	1	CMOS LOGIC		TC74HC32AF	TOSHIBA
U28	1	CMOS LOGIC		TC74HC32AF	TOSHIBA
U29	1	AMPLIFIER IC		UPC812G2	NEC
U3	1	CMOS LOGIC		TC74HC74AF	TOSHIBA
U30	1	A/D & D/A		LTC1257CS8	LINEARTECH
U31	1	AMPLIFIER IC		UPC812G2	NEC
U32	1	A/D & D/A		LTC1257CS8	LINEARTECH
U34	1	A/D & D/A		LTC1257CS8	LINEARTECH
U35	1	AMPLIFIER IC		UPC812G2	NEC

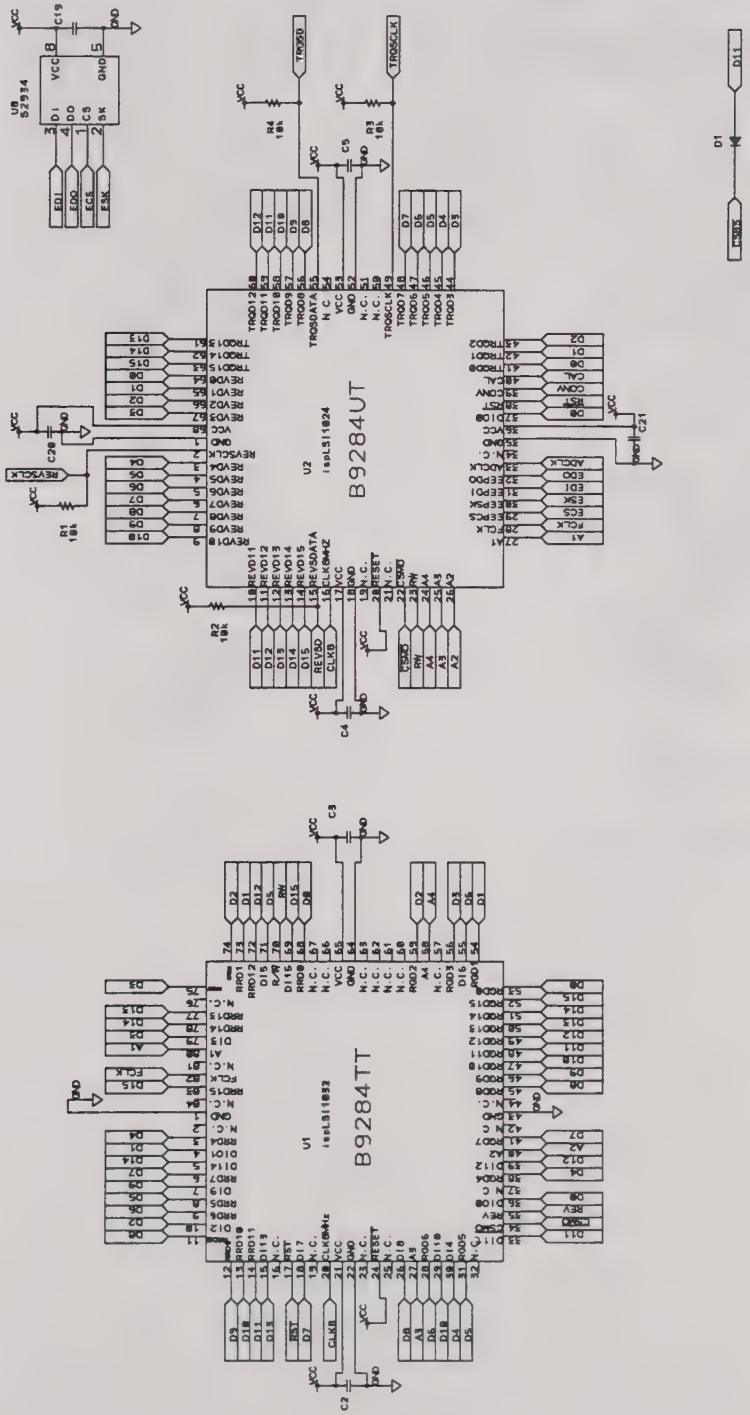
List of Electrical Parts (B9824RS) Continued

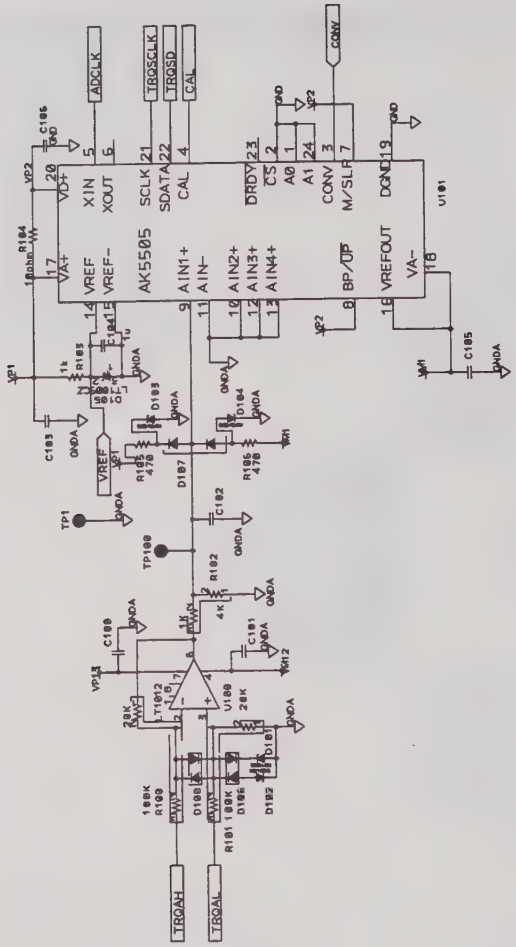
Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
U36	1	A/D & D/A		LTC1257CS8	LINEARTECH
U38	1	A/D & D/A		LTC1257CS8	LINEARTECH
U39	1	AMPLIFIER IC		UPC812G2	NEC
U4	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U40	1	A/D & D/A		LTC1257CS8	LINEARTECH
U5	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U6	1	CMOS LOGIC		TC74HC04AF	TOSHIBA
U7	1	CMOS LOGIC		TC74HC74AF	TOSHIBA
U8	1	CMOS LOGIC		TC74HC74AF	TOSHIBA
U9	1	CMOS LOGIC		TC74HC74AF	TOSHIBA

6.10 Motor Board Assembly (B9284PT)

6.10.1 Schematic Diagrams

Page 1 of 4





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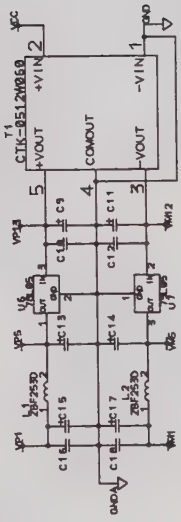

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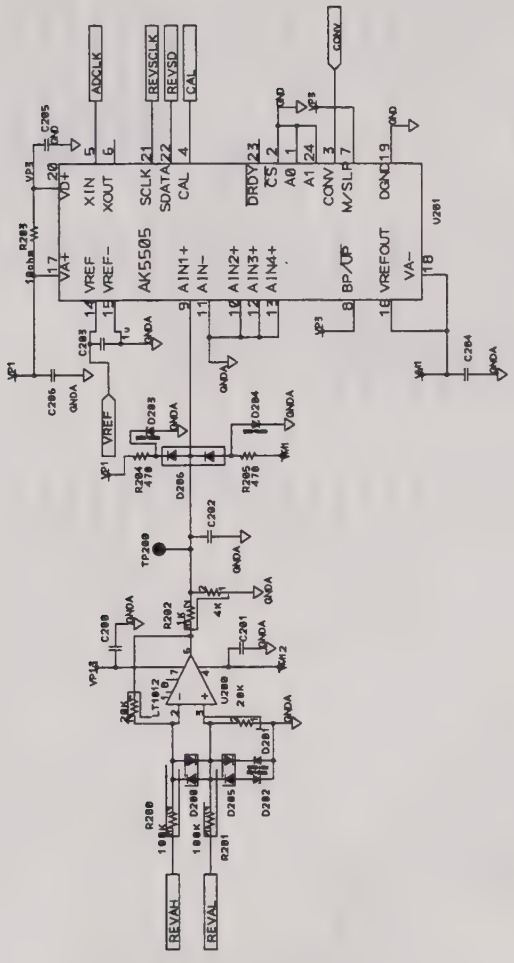

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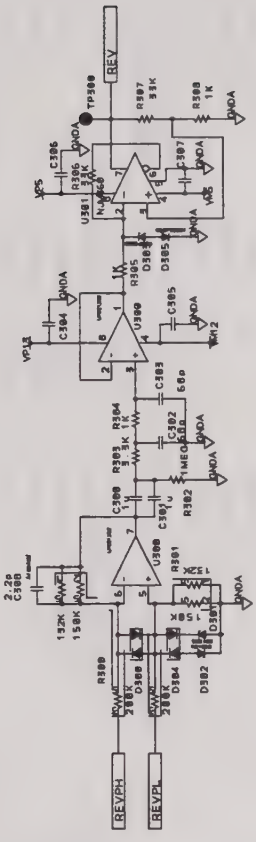

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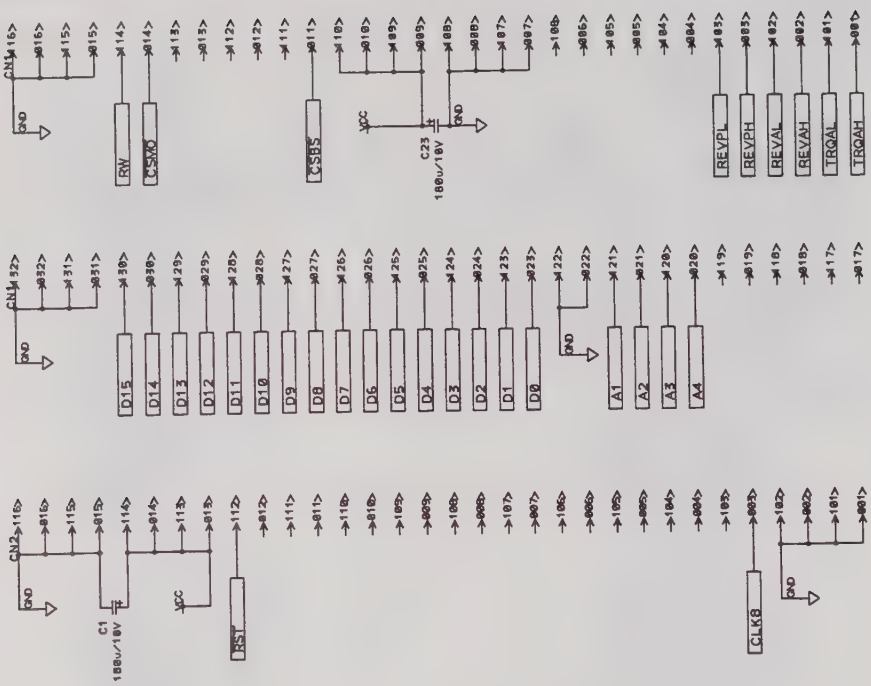
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CSMO
CSBS
VCC
C23
100u/10V
REVPL
REVPH
REVAL
REVAH
TRQAL
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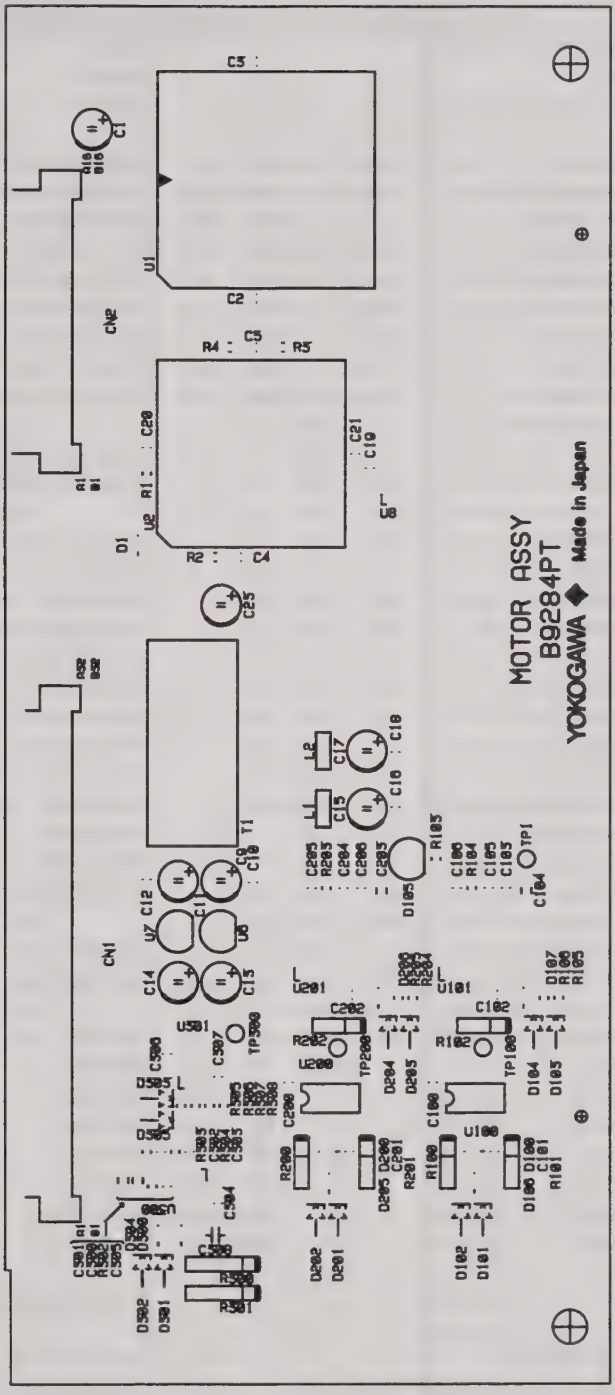
CN2
D15
D14
D13
D12
D11
D10
D9
D8
D7
D6
D5
D4
D3
D2
D1
D0
A1
A2
A3
A4
C1
100u/10V
RST
CLK8

6.10.2 Location of Components



6.10.3 List of Electrical Parts (B9284PT)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	MOTOR SMC ASSY		B9284RT	YOKOGAWA
2	1	PSLI1032		B9284TT	YOKOGAWA
3	1	PLSI1024		B9284UT	YOKOGAWA
C1	1	ALMINUM CAP	180 μF ±20% 10V	SXE10VB-180	NITSUCHEMI
C11	1	ALUMINUM CAP	56 μF ±20% 35V	SXE35VB-56	NITSUCHEMI
C13	1	ALUMINUM CAP	56 μF ±20% 35V	SXE35VB-56	NITSUCHEMI
C14	1	ALUMINUM CAP	56 μF ±20% 35V	SXE35VB-56	NITSUCHEMI
C15	1	ALUMINUM CAP	56 μF ±20% 35V	SXE35VB-56	NITSUCHEMI
C17	1	ALUMINUM CAP	56 μF ±20% 35V	SXE35VB-56	NITSUCHEMI
C23	1	ALMINUM CAP	56 μF ±20% 10V	SXE10VB-180	NITSUCHEMI
C308	1	MICA CAP	2.2pF ±10% 100V	DM05C2R2K1	NITSUKO
C9	1	ALUMINUM CAP	56 μF ±20% 35V	SXE35VB-56	NITSUCHEMI
CN1	1	BOARD CONN		PCN10A-64P-2.54DS	HIROSE
CN2	1	BOARD CONN		PCN10A-32P-2.54DS	HIROSE
D101	1	ZENER DIODE		RD10ESB1	NEC
D102	1	ZENER DIODE		RD10ESB1	NEC
D103	1	ZENER DIODE		RD3.3ESB	NEC
D104	1	ZENER DIODE		RD3.3ESB	NEC
D105	1	VOLTAGE RGLTR		LT1009CZ	LINEARTECH
D201	1	ZENER DIODE		RD10ESB1	NEC
D202	1	ZENER DIODE		RD10ESB1	NEC
D203	1	ZENER DIODE		RD3.3ESB	NEC
D204	1	ZENER DIODE		RD3.3ESB	NEC
D301	1	ZENER DIODE		RD10ESB1	NEC
D302	1	ZENER DIODE		RD10ESB1	NEC
D303	1	ZENER DIODE		RD3.9ESB1	NEC
D305	1	ZENER DIODE		RD3.9ESB1	NEC
L1	1	MAGNETIC PART		ZBF253D-00	TDK
L2	1	MAGNETIC PART		ZBF253D-00	TDK
R100	1	RES MODULE	2* MF 0.2W	MRP1897	TAMA
R101	1	RES MODULE	2* MF 0.2W	MRP1897	TAMA
R102	1	RES MODULE	2* MF 0.2W	MRP1900	TAMA
R200	1	RES MODULE	2* MF 0.2W	MRP1897	TAMA
R201	1	RES MODULE	2* MF 0.2W	MRP1897	TAMA
R202	1	RES MODULE	2* MF 0.2W	MRP1900	TAMA
R300	1	RES MODULE	3* MF300mW	TNP5PS1013	TKD
R301	1	RES MODULE	3* MF300mW	TNP5PS1013	TKD
T1	1	DC/DC		CTK-0512W060	SANYU
U1	1	SOCKET & HOLDER		PLPS-N84B-TK	JAE
U100	1	AMPLIFIER IC		LT1012DN8	AD
U2	1	SOCKET & HOLDER		QILE68P-10JT	BURNDY
U200	1	AMPLIFIER IC		LT1012DN8	AD
U6	1	VOLTAGE RGLTR		UPC78L05J	NEC
U7	1	VOLTAGE RGLTR		UPC79L05J	NEC

List of Electrical Parts (B9284RT)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	MOTOR PWB		B9284QT	YOKOGAWA
C10	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C100	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C101	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C102	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C103	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C104	1	CERAMIC CAP	1μF-20～80% 16V	C13Y5V1C105ZP*	TOKIN
C105	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C106	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C12	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C16	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C18	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C19	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C2	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C20	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C200	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C201	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C202	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C203	1	CERAMIC CAP	1μF-20～80% 16V	C13Y5V1C105ZP*	TOKIN
C204	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C205	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C206	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C21	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C3	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C300	1	CERAMIC CAP	1μF-20～80% 16V	C13Y5V1C105ZP*	TOKIN
C301	1	CERAMIC CAP	1μF-20～80% 16V	C13Y5V1C105ZP*	TOKIN
C302	1	CERAMIC CAP	68pF ±5% 50V	C2102CH1H680J*	TDK
C303	1	CERAMIC CAP	68pF ±5% 50V	C2102CH1H680J*	TDK
C304	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C305	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C306	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C307	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C4	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C5	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
D1	1	DIODE		MA159A	MATSUSHITA
D100	1	DIODE		MA159A	MATSUSHITA
D106	1	DIODE		MA159A	MATSUSHITA
D107	1	DIODE		MA159A	MATSUSHITA
D200	1	DIODE		MA159A	MATSUSHITA
D205	1	DIODE		MA159A	MATSUSHITA
D206	1	DIODE		MA159A	MATSUSHITA
D300	1	DIODE		MA159A	MATSUSHITA
D304	1	DIODE		MA159A	MATSUSHITA
R1	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R103	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R104	1	METAL OXIDE RES	10Ω ±1% 0.1W	ERJ6ENF10R0*	MATSUSHITA
R105	1	METAL OXIDE RES	470Ω ±1% 0.1W	ERJ6ENF4700*	MATSUSHITA
R106	1	METAL OXIDE RES	470Ω ±1% 0.1W	ERJ6ENF4700*	MATSUSHITA
R2	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R203	1	METAL OXIDE RES	10Ω ±1% 0.1W	ERJ6ENF10R0*	MATSUSHITA
R204	1	METAL OXIDE RES	470Ω ±1% 0.1W	ERJ6ENF4700*	MATSUSHITA
R205	1	METAL OXIDE RES	470Ω ±1% 0.1W	ERJ6ENF4700*	MATSUSHITA

List of Electrical Parts (B9284RT) Continued

Item	Q'ty	Part Name	Description			MFR Part Name	MFR Name
R3	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R302	1	METAL OXIDE RES	1MΩ	±1%	0.1W	ERJ6ENF1004*	MATSUSHITA
R303	1	METAL OXIDE RES	3.3kΩ	±1%	0.1W	ERJ6ENF3301*	MATSUSHITA
R304	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R305	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R306	1	METAL OXIDE RES	33kΩ	±1%	0.1W	ERJ6ENF3302*	MATSUSHITA
R307	1	METAL OXIDE RES	33kΩ	±1%	0.1W	ERJ6ENF3302*	MATSUSHITA
R308	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R4	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
U101	1	A/D & D/A				AK5505-VS	ASAHIMICRO
U201	1	A/D & D/A				AK5505-VS	ASAHIMICRO
U300	1	AMPLIFIER IC				UPC812G2	NEC
U301	1	COMPARATOR IC				NJM360M	JRC
U8	1	MEMORY				S-29L330ADFE	SEIKO

6.11 DA Board Assembly (B9293PJ)

6.11.1 Schematic Diagrams

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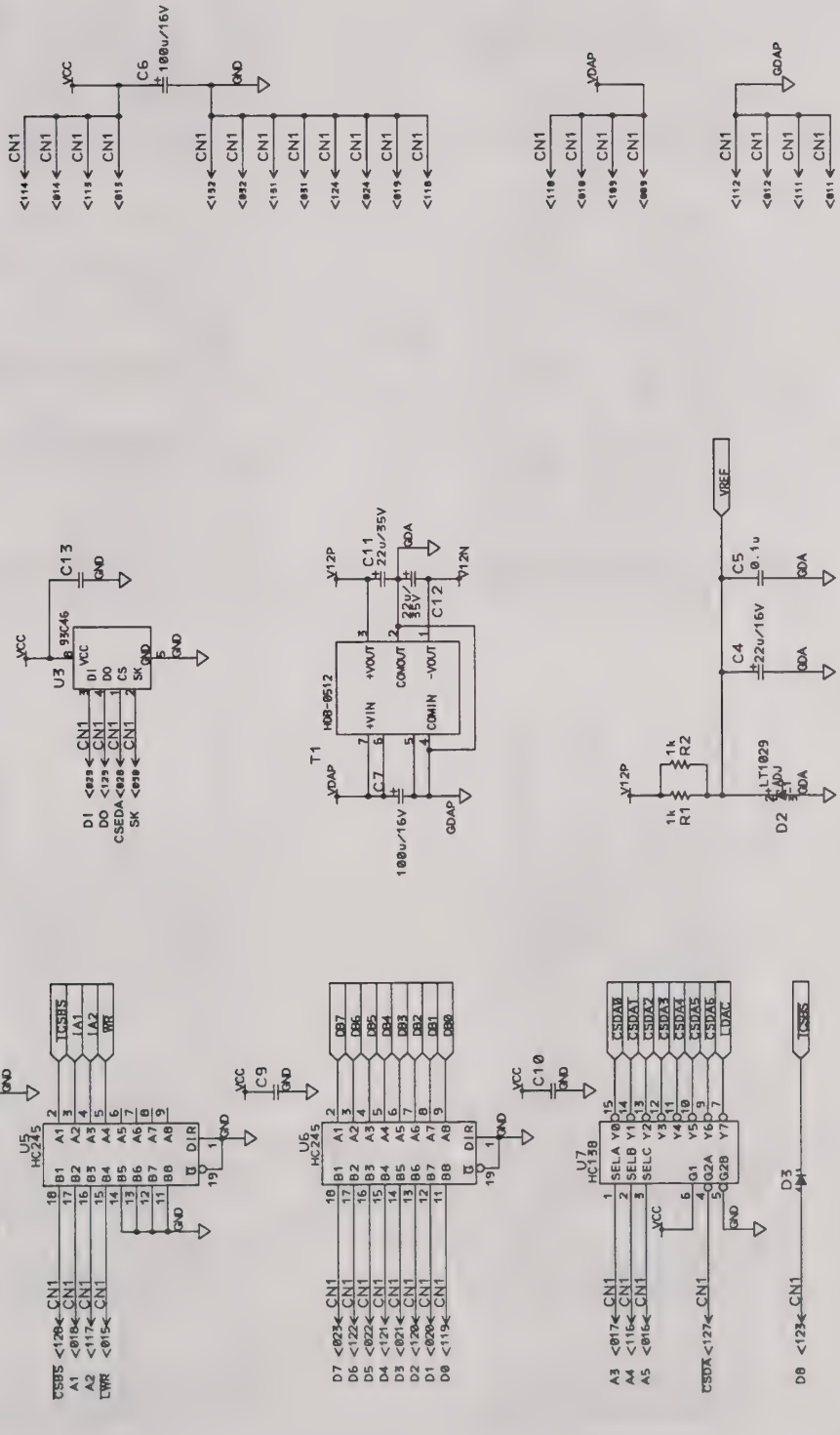

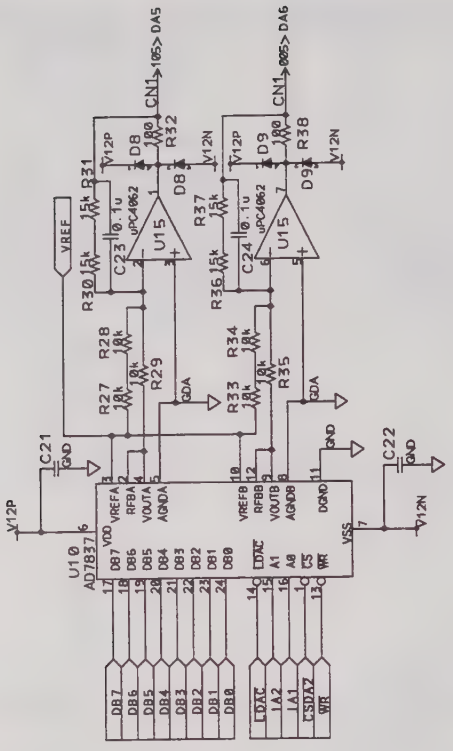

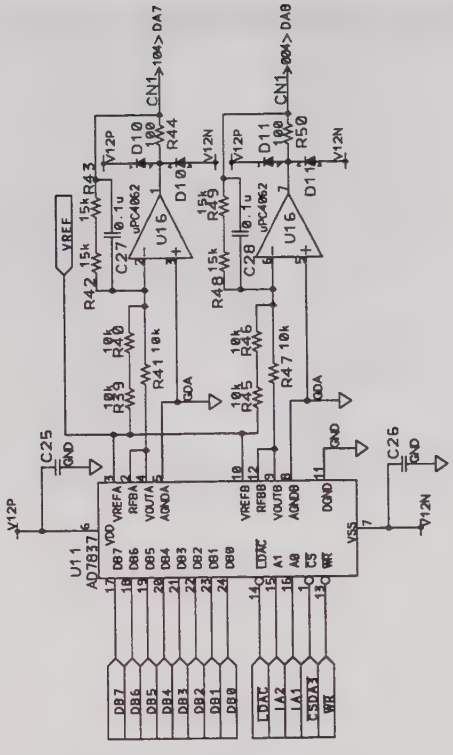

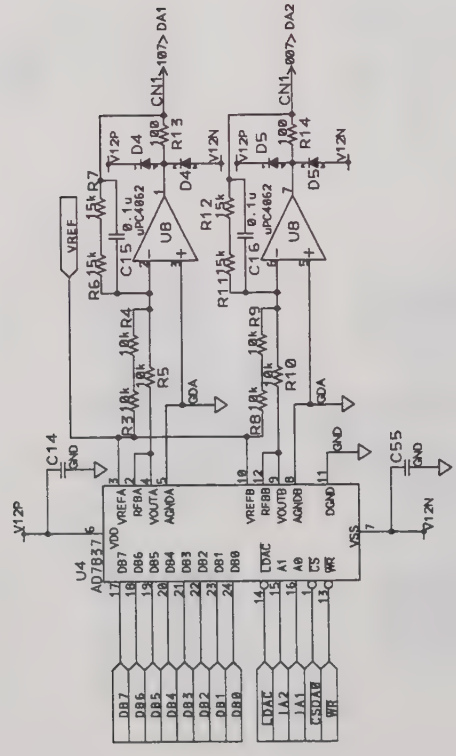

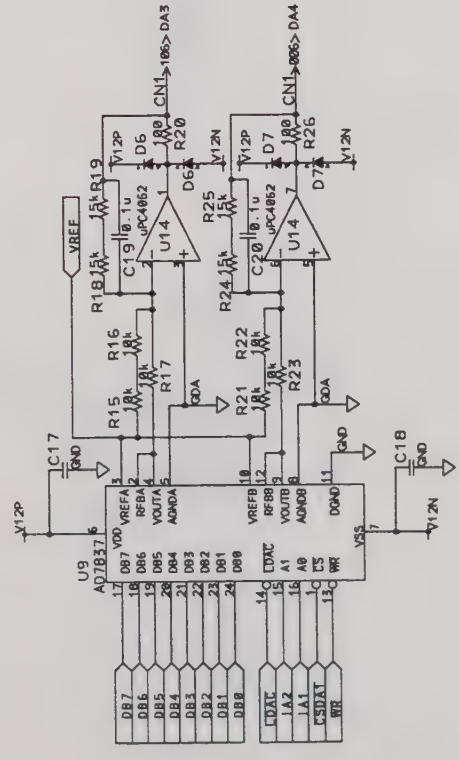

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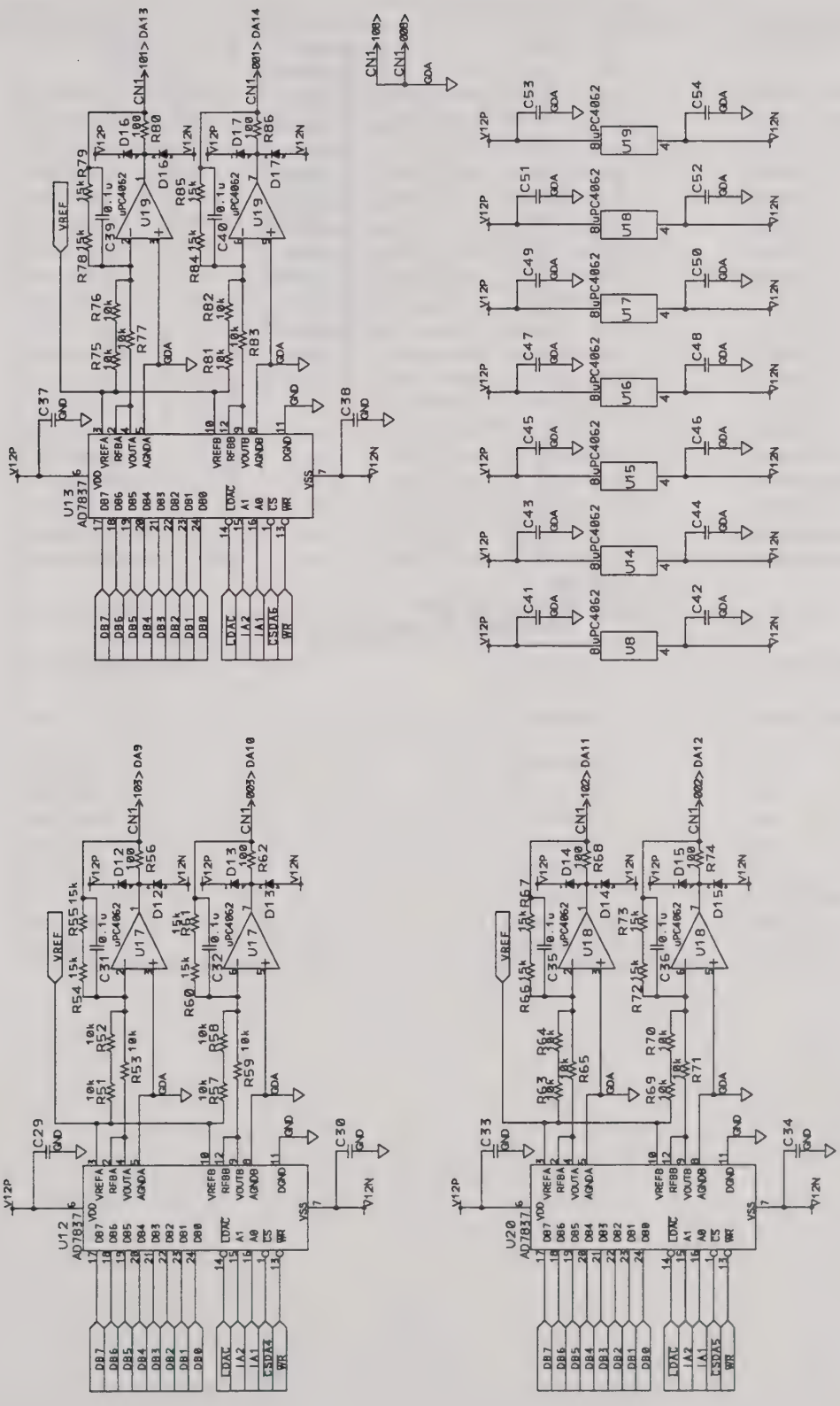
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DB2
DB1
DB0
CSDAC
GND
AGND
V12P
V12N
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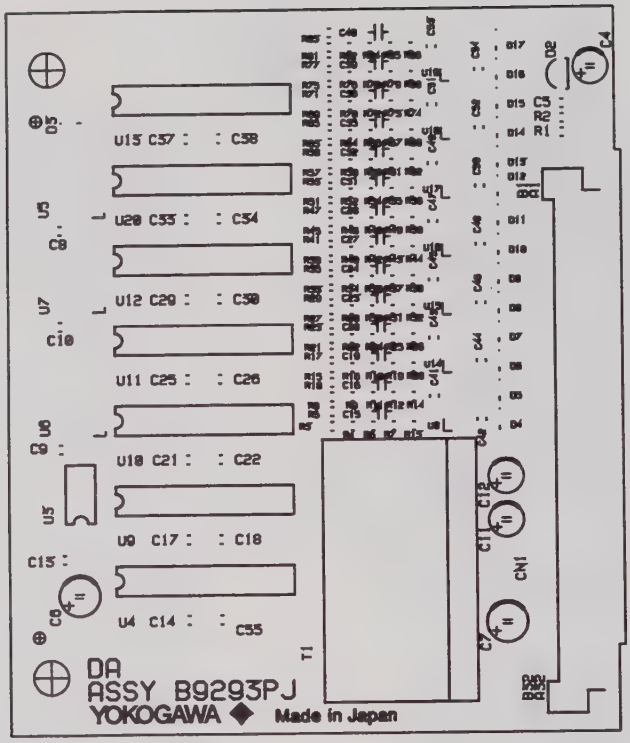
6.11.2 Location of Components



6.11.3 List of Electrical Parts (B9293PJ)

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	DA SMC ASSY		B9293RJ	YOKOGAWA
C11	1	ALUMINUM CAP	22 μF ±20% 35V	ECEA1VU220	MATSUSHITA
C12	1	ALUMINUM CAP	22 μF ±20% 35V	ECEA1VU220	MATSUSHITA
C15	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C16	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C19	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C20	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C23	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C24	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C27	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C28	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C31	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C32	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C35	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C36	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C39	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C4	1	ALUMINUM CAP	22 μF ±20% 16V	ECEA1CU220	MATSUSHITA
C40	1	FILM CAP	0.1 μF ±10% 63V	SMC-E104J63	SIZUKI
C6	1	ALUMINUM CAP	100 μF ±20% 16V	ECEA1CU101	MATSUSHITA
C7	1	ALUMINUM CAP	100 μF ±20% 16V	ECEA1CU101	MATSUSHITA
CN1	1	BOARD CONN		PCN10A-64P-2.54DS	HIROSE
D2	1	VOLTAGE RGLTR		LT1029CZ	LINEARTECH
T1	1	DC/DC		HDB-0512-F	SHINDENGEN
U10	1	A/D & D/A		AD7837AN	AD
U11	1	A/D & D/A		AD7837AN	AD
U12	1	A/D & D/A		AD7837AN	AD
U13	1	A/D & D/A		AD7837AN	AD
U20	1	A/D & D/A		AD7837AN	AD
U3	1	IC		B9280VD	YOKOGAWA
U4	1	A/D & D/A		AD7837AN	AD
U9	1	A/D & D/A		AD7837AN	AD

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	PWB		B9293QJ	YOKOGAWA
C10	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C13	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C14	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C17	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C18	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C21	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C22	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C25	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C26	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C29	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C30	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C33	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C34	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C37	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C38	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C41	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C42	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C43	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C44	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C45	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C46	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C47	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C48	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C49	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C5	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C50	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C51	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C52	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C53	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C54	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C55	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C8	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
C9	1	CER CAPACITOR	0.1μF-20～80% 50V	C2012Y5V1H104Z*	TDK
D10	1	DIODE		MA159A	MATSUSHITA
D11	1	DIODE		MA159A	MATSUSHITA
D12	1	DIODE		MA159A	MATSUSHITA
D13	1	DIODE		MA159A	MATSUSHITA
D14	1	DIODE		MA159A	MATSUSHITA
D15	1	DIODE		MA159A	MATSUSHITA
D16	1	DIODE		MA159A	MATSUSHITA
D17	1	DIODE		MA159A	MATSUSHITA
D3	1	DIODE		MA159A	MATSUSHITA
D4	1	DIODE		MA159A	MATSUSHITA
D5	1	DIODE		MA159A	MATSUSHITA
D6	1	DIODE		MA159A	MATSUSHITA
D7	1	DIODE		MA159A	MATSUSHITA
D8	1	DIODE		MA159A	MATSUSHITA
D9	1	DIODE		MA159A	MATSUSHITA
R1	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R10	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R11	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA

List of Electrical Parts (B9293RJ) Continued

Item	Q'ty	Part Name	Description			MFR Part Name	MFR Name
R12	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R13	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R14	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R15	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R16	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R17	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R18	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R19	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R2	1	METAL OXIDE RES	1kΩ	±1%	0.1W	ERJ6ENF1001*	MATSUSHITA
R20	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R21	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R22	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R23	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R24	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R25	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R26	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R27	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R28	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R29	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R3	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R30	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R31	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R32	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R33	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R34	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R35	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R36	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R37	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R38	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R39	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R4	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R40	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R41	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R42	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R43	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R44	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R45	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R46	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R47	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R48	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R49	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R5	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R50	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R51	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R52	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R53	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R54	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R55	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R56	1	METAL OXIDE RES	100Ω	±1%	0.1W	ERJ6ENF1000*	MATSUSHITA
R57	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R58	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R59	1	METAL OXIDE RES	10kΩ	±1%	0.1W	ERJ6ENF1002*	MATSUSHITA
R6	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R60	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA
R61	1	METAL OXIDE RES	15kΩ	±1%	0.1W	ERJ6ENF1502*	MATSUSHITA

Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
R62	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R63	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R64	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R65	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R66	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA
R67	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA
R68	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R69	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R7	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA
R70	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R71	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R72	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA
R73	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA
R74	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R75	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R76	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R77	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R78	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA
R79	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA
R8	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R80	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R81	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R82	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R83	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R84	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA
R85	1	METAL OXIDE RES	15kΩ ±1% 0.1W	ERJ6ENF1502*	MATSUSHITA
R86	1	METAL OXIDE RES	100Ω ±1% 0.1W	ERJ6ENF1000*	MATSUSHITA
R9	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
U14	1	AMPLIFIER IC		UPC4062G2	NEC
U15	1	AMPLIFIER IC		UPC4062G2	NEC
U16	1	AMPLIFIER IC		UPC4062G2	NEC
U17	1	AMPLIFIER IC		UPC4062G2	NEC
U18	1	AMPLIFIER IC		UPC4062G2	NEC
U19	1	AMPLIFIER IC		UPC4062G2	NEC
U5	1	CMOS LOGIC		TC74HC245AF	TOSHIBA
U6	1	CMOS LOGIC		TC74HC245AF	TOSHIBA
U7	1	CMOS LOGIC		TC74HC138AF	TOSHIBA
U8	1	AMPLIFIER IC		UPC4062G2	NEC

6.12 Printer Board Assembly (B9293PK)

6.12.1 Schematic Diagrams

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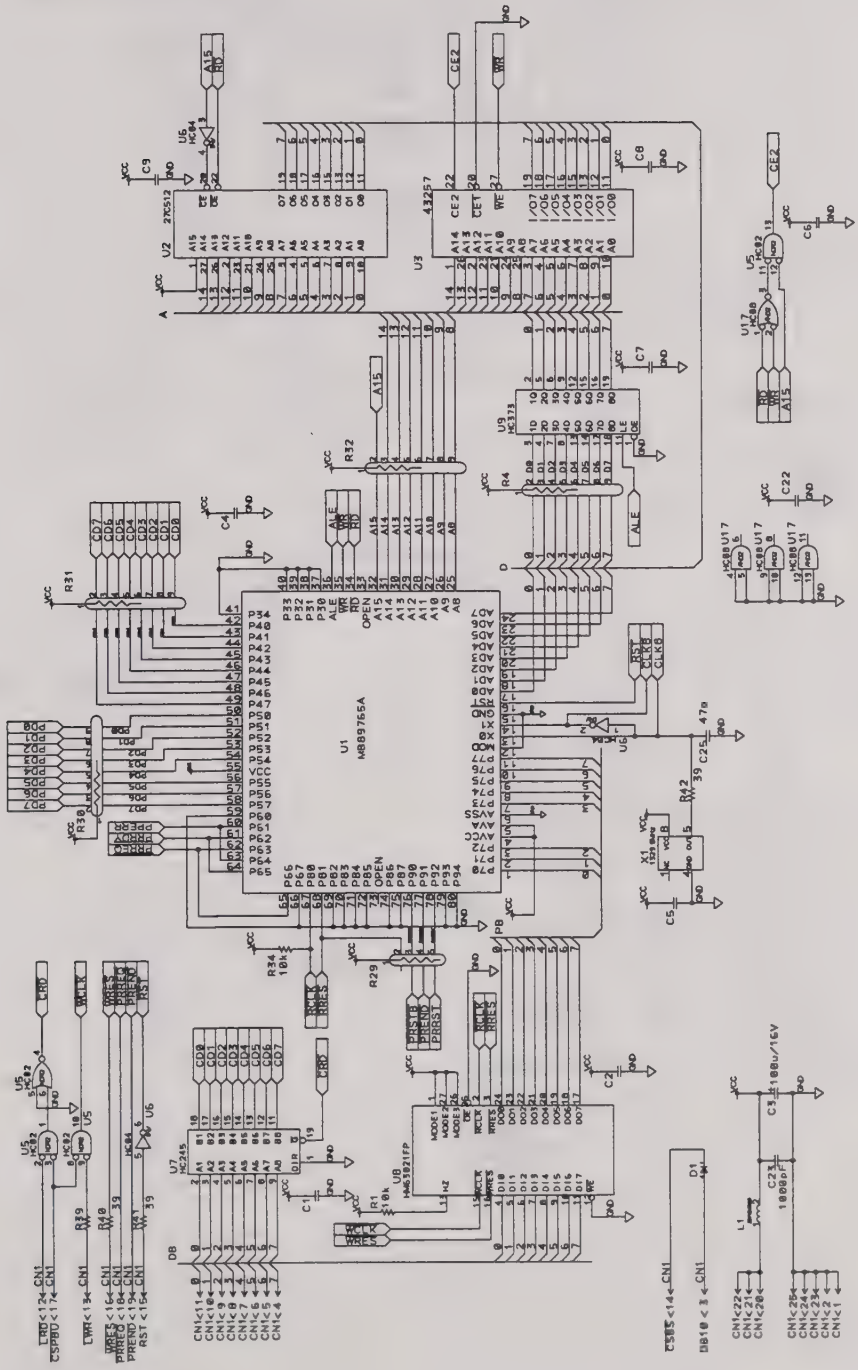
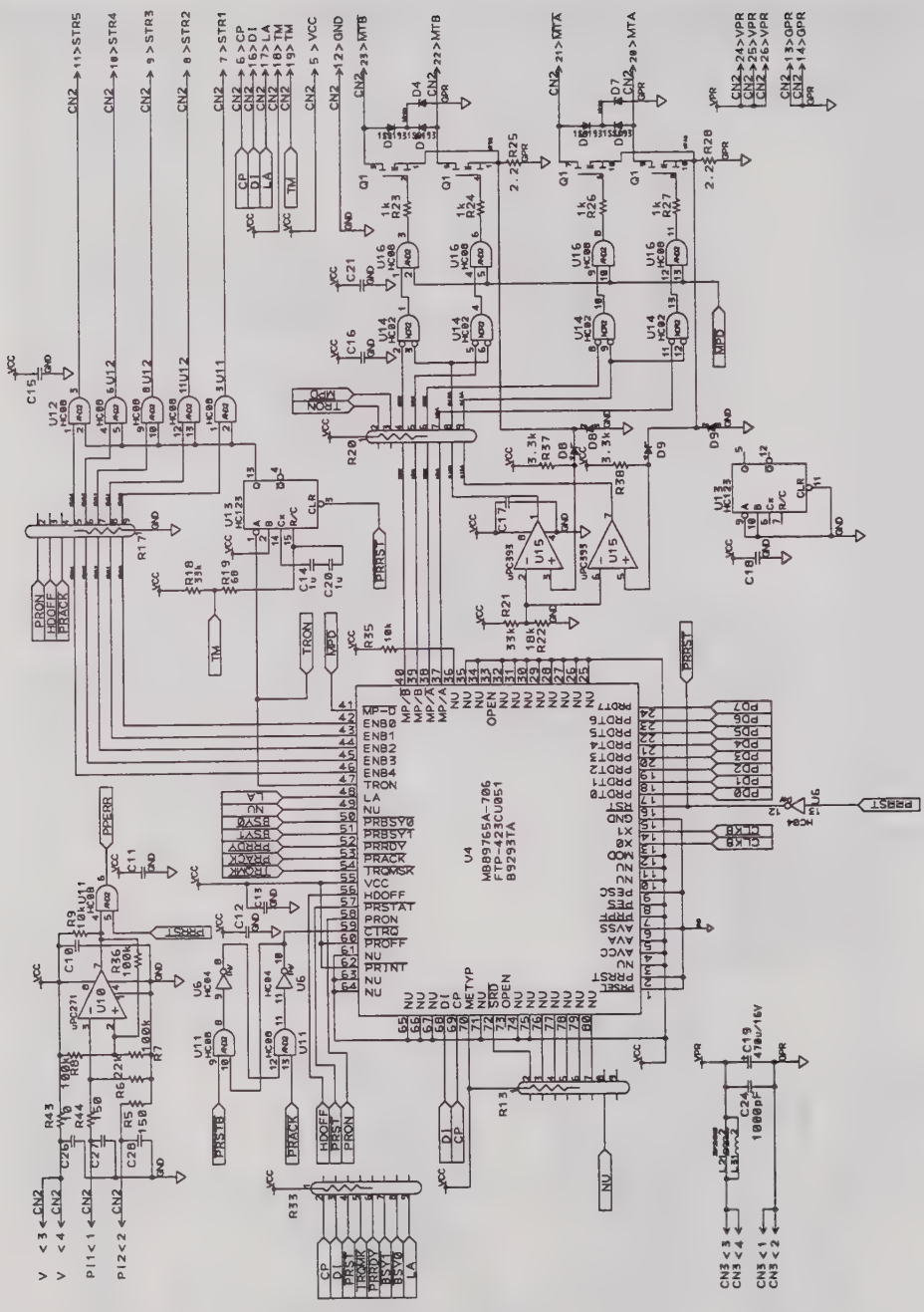
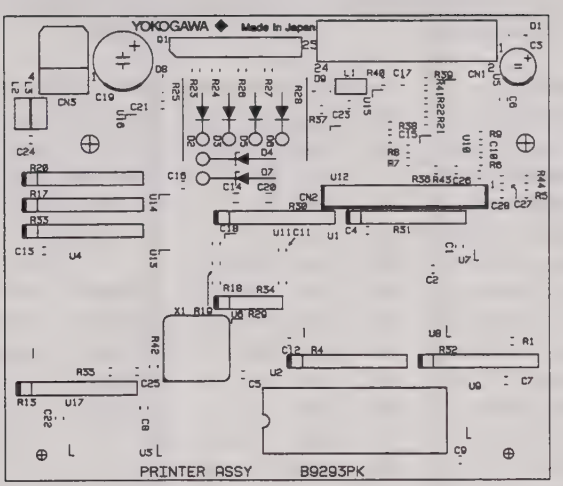




6.12.2 Location of Components



6.12.3 List of Electrical Parts (B9293PK)

Item	Q'ty	Part Name	Description			MFR Part Name	MFR Name
1	1	PRINTER SMC ASSY				B9293RK	YOKOGAWA
C19	1	ALUMINUM CAP	470 μF	±20%	16V	ECEA1CU471	MATSUSHITA
C3	1	ALUMINUM CAP	100 μF	±20%	16V	ECEA1CU101	MATSUSHITA
CN1	1	POST TYPE CONN				HLEM25R-1	BURNDY
CN2	1	POST TYPE CONN				SLW26S-1C7	BURNDY
CN3	1	POST TYPE CONN				5046-04A	MOLEX
D2	1	DIODE				DS135E	SANYO
D3	1	DIODE				DS135E	SANYO
D4	1	ZENER DIODE				RD12FB	NEC
D5	1	DIODE				DS135E	SANYO
D6	1	DIODE				DS135E	SANYO
D7	1	ZENER DIODE				RD12FB	NEC
L1	1	MAGNETIC PART				ZBF253D-00	TDK
L2	1	MAGNETIC PART				ZBF253D-00	TDK
L3	1	MAGNETIC PART				ZBF253D-00	TDK
Q1	1	SC MODULE				UPA1526H	NEC
R13	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R17	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R20	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R25	1	METAL OXIDE RES	2.2Ω	±5%	1W	ERX-1ANJ2R2	MATSUSHITA
R28	1	METAL OXIDE RES	2.2Ω	±5%	1W	ERX-1ANJ2R2	MATSUSHITA
R29	1	RES MODULE	10kΩ	±5%	0.35W	MRGC05X10K J	TAMA
R30	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R31	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R32	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R33	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
R4	1	RES MODULE	10kΩ	±5%	0.7W	MRGC09X10K J	TAMA
U2	1	PRN ROM ASSY				B9293TK	YOKOGAWA
X1	1	CRYSTAL UNIT				1329 8MHZ	NIHONDENPA

List of Electrical Parts (B9293RK)

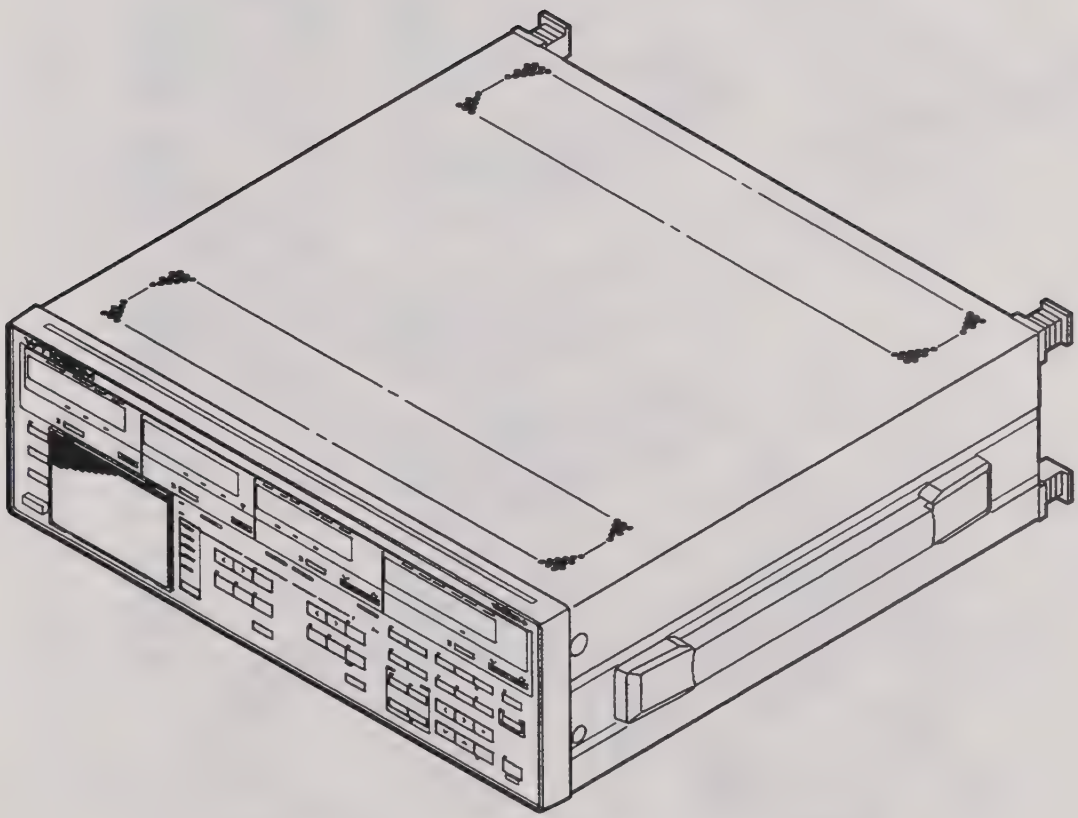
Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
1	1	PWB		B9293QK	YOKOGAWA
C1	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C10	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C11	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C12	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C13	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C14	1	CERAMIC CAP	1μF-20~80% 16V	C13Y5V1C105ZP*	TOKIN
C15	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C16	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C17	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C18	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C2	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C20	1	CERAMIC CAP	1μF-20~80% 16V	C13Y5V1C105ZP*	TOKIN
C21	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C22	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C23	1	CERAMIC CAP	1000pF ±5% 50V	ECU-*1H102JCX	MATSUSHITA
C24	1	CERAMIC CAP	1000pF ±5% 50V	ECU-*1H102JCX	MATSUSHITA
C25	1	CER CAPACITOR	47pF ±5% 50V	C2012CH1H470J*	TDK
C26	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C27	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C28	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C4	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C5	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C6	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C7	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C8	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
C9	1	CER CAPACITOR	0.1μF-20~80% 50V	C2012Y5V1H104Z*	TDK
D1	1	DIODE		MA159A	MATSUSHITA
D8	1	DIODE		MA159A	MATSUSHITA
D9	1	DIODE		MA159A	MATSUSHITA
R1	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R18	1	METAL OXIDE RES	47kΩ ±1% 0.1W	ERJ6ENF4702*	MATSUSHITA
R19	1	METAL OXIDE RES	150Ω ±1% 0.1W	ERJ6ENF1500*	MATSUSHITA
R21	1	METAL OXIDE RES	33kΩ ±1% 0.1W	ERJ6ENF3302*	MATSUSHITA
R22	1	METAL OXIDE RES	18kΩ ±1% 0.1W	ERJ6ENF1802*	MATSUSHITA
R23	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R24	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R26	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R27	1	METAL OXIDE RES	1kΩ ±1% 0.1W	ERJ6ENF1001*	MATSUSHITA
R34	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R35	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
R36	1	METAL OXIDE RES	100kΩ ±1% 0.1W	ERJ6ENF1003*	MATSUSHITA
R37	1	METAL OXIDE RES	3.3kΩ ±1% 0.1W	ERJ6ENF3301*	MATSUSHITA
R38	1	METAL OXIDE RES	3.3kΩ ±1% 0.1W	ERJ6ENF3301*	MATSUSHITA
R39	1	METAL OXIDE RES	39Ω ±1% 0.1W	ERJ6ENF39R0*	MATSUSHITA
R40	1	METAL OXIDE RES	39Ω ±1% 0.1W	ERJ6ENF39R0*	MATSUSHITA
R41	1	METAL OXIDE RES	39Ω ±1% 0.1W	ERJ6ENF39R0*	MATSUSHITA
R42	1	METAL OXIDE RES	39Ω ±1% 0.1W	ERJ6ENF39R0*	MATSUSHITA
R43	1	METAL OXIDE RES	10Ω ±1% 0.1W	ERJ6ENF10R0*	MATSUSHITA
R44	1	METAL OXIDE RES	150Ω ±1% 0.1W	ERJ6ENF1500*	MATSUSHITA
R5	1	METAL OXIDE RES	150Ω ±1% 0.1W	ERJ6ENF1500*	MATSUSHITA
R6	1	METAL OXIDE RES	22kΩ ±1% 0.1W	ERJ6ENF2202*	MATSUSHITA

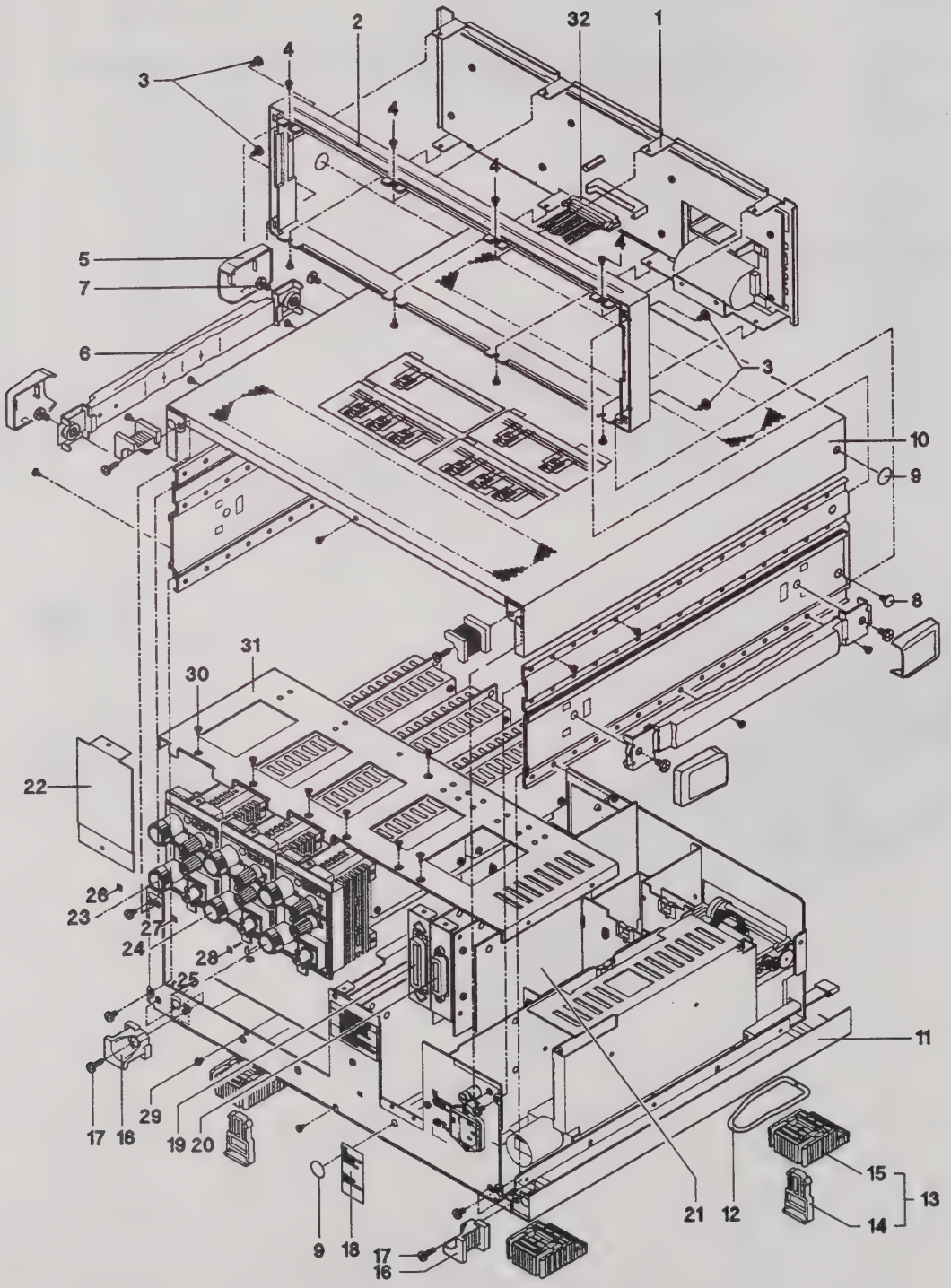
Item	Q'ty	Part Name	Description	MFR Part Name	MFR Name
R7	1	METAL OXIDE RES	100kΩ ±1% 0.1W	ERJ6ENF1003*	MATSUSHITA
R8	1	METAL OXIDE RES	100kΩ ±1% 0.1W	ERJ6ENF1003*	MATSUSHITA
R9	1	METAL OXIDE RES	10kΩ ±1% 0.1W	ERJ6ENF1002*	MATSUSHITA
U1	1	MB89765-101		B9586HC	YOKOGAWA
U10	1	COMPARATOR IC		UPC271G2	NEC
U11	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U12	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U13	1	CMOS LOGIC		TC74HC123AF	TOSHIBA
U14	1	CMOS LOGIC		TC74HC02AF	TOSHIBA
U15	1	COMPARATOR IC		UPC393G2	NEC
U16	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U17	1	CMOS LOGIC		TC74HC08AF	TOSHIBA
U3	1	MEMORY		UPD43257BGU-85L	NEC
U4	1	FTP-423CU051		B9293TA	YOKOGAWA
U5	1	CMOS LOGIC		TC74HC02AF	TOSHIBA
U6	1	CMOS LOGIC		TC74HC04AF	TOSHIBA
U7	1	CMOS LOGIC		TC74HC245AF	TOSHIBA
U8	1	MEMORY		HM63021FP-34	HITACHI
U9	1	CMOS LOGIC		TC74HC373AF	TOSHIBA

Chapter 7 CUSTOMER MAINTENANCE PARTS LIST

This chapter contains the Customer Maintenance Parts Lists for ordering parts and location of the parts in the sinstruments.

Page 1 of 8 View of the Model

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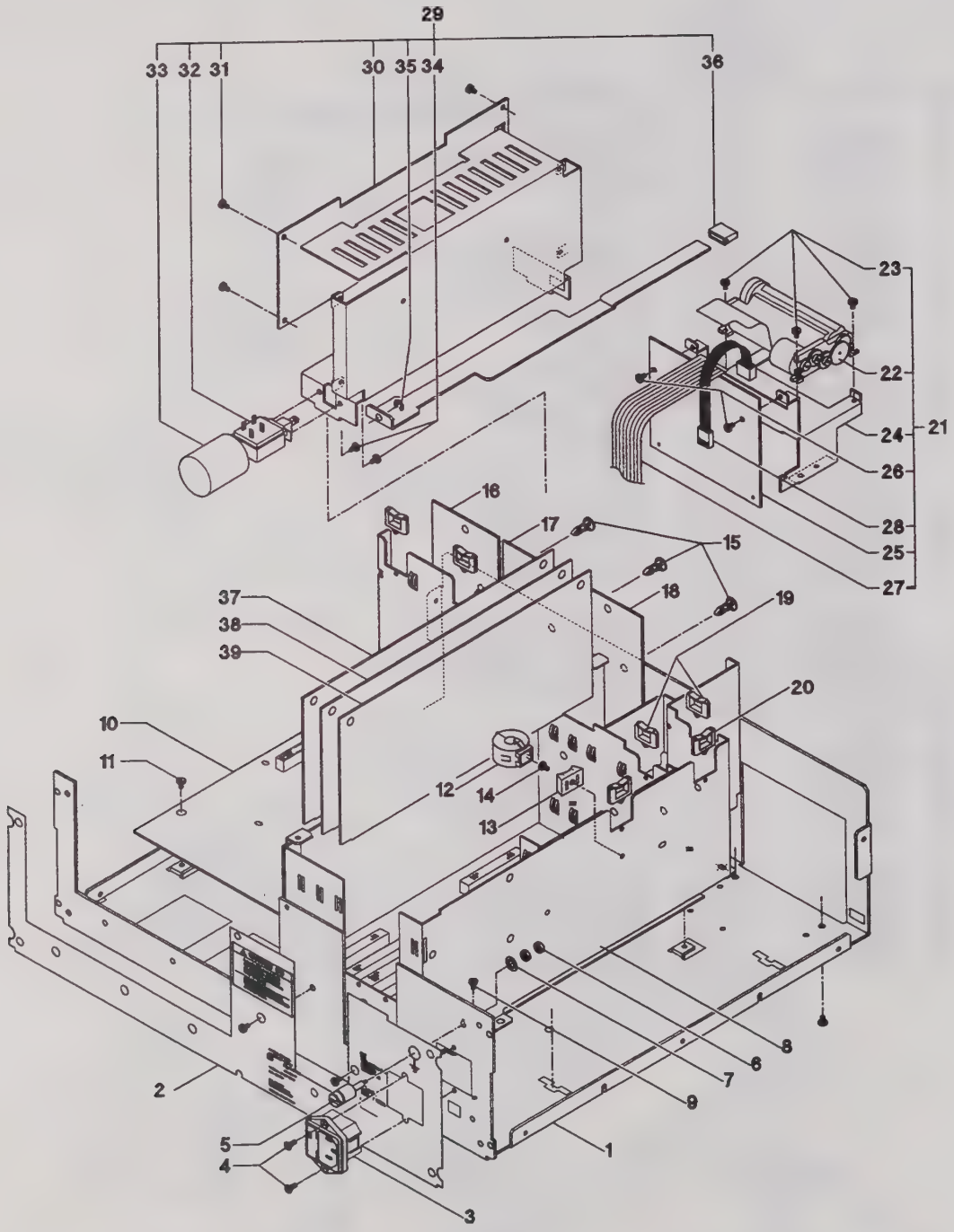
Item	Part No.	Model	Qty 253610	253620	253630	253640	Description	
1	–		1	1	1	1	Front Panel Assembly (see page 6)	
2	B9293CL		1	1	1	1	Front Bezel	
3	Y9414TS		4	4	4	4	Tapping Screw M4x14	
4	Y9305LB		8	8	8	8	B.H.Screw, M3x5	
5	A9065ZM		4	4	4	4	Cover	
6	B9919CV		2	2	2	2	Grip Assembly	
7	Y9512LS		4	4	4	4	B.H.Screw, M5x12	
8	A9068ZB		2	2	2	2	Cap	
9	A9069ZB		3	3	3	3	Sheet	
10	B9293DS		1	1	1	1	Top Cover	
11	B9293DU		1	1	1	1	Bottom Cover	
12	A9086ZM		2	2	2	2	Support	
13	A9120ZM		4	4	4	4	Foot Assembly	
14	A9110ZM		1	1	1	1	Spacer	
15	A9083ZM		1	1	1	1	Foot	
16	A9085ZM		4	4	4	4	Foot	
17	Y9408LB		4	4	4	4	B.H.Screw, M4x8	
18	B9284HF		1	1	1	1	Sheet *5	
19	B9284HG		1	1	1	1	CPU Assembly	
20	B9284HH		1	1	1	1	GP-IB Assembly *1	(select)
	B9284HJ		1	1	1	1	GP-IB HRM Assembly *2	(select)
	B9284HK		1	1	1	1	RS-232C Assembly *3	(select)
	B9284HL		1	1	1	1	RS-232C HRM Assembly *4	(select)
21	B9293PJ		1	1	1	1	DA Assembly *6	
22	B9284CY		2	1			Panel	
23	B9284GS			1	1	1	Input Assembly	
24	B9284GS		1		1	1	Input Assembly	
25	B9284GS			1	1	1	Input Assembly	
26	A9417ZJ		1	1	1	1	Name Plate (1)	
27	A9418ZJ				1	1	Name Plate (2)	
28	A9419ZJ			1	1	1	Name Plate (3)	
29	Y9305LB		3	3	3	3	B.H.Screw, M3x5	
30	Y9305EB		7	7	7	7	F.H.Screw, M3x5	
31	B9284CX		1	1	1	1	Bracket	
32	B9293LA		1	1	1	1	Cable Assembly	

Note:

*1 2536 □□ – C1
*2 2536 □□ – C1 –/HRM
*3 2536 □□ – C2
*4 2536 □□ – C2 –/HRM
*5 2536 □□ – 5
*6 2536 □□ – /DA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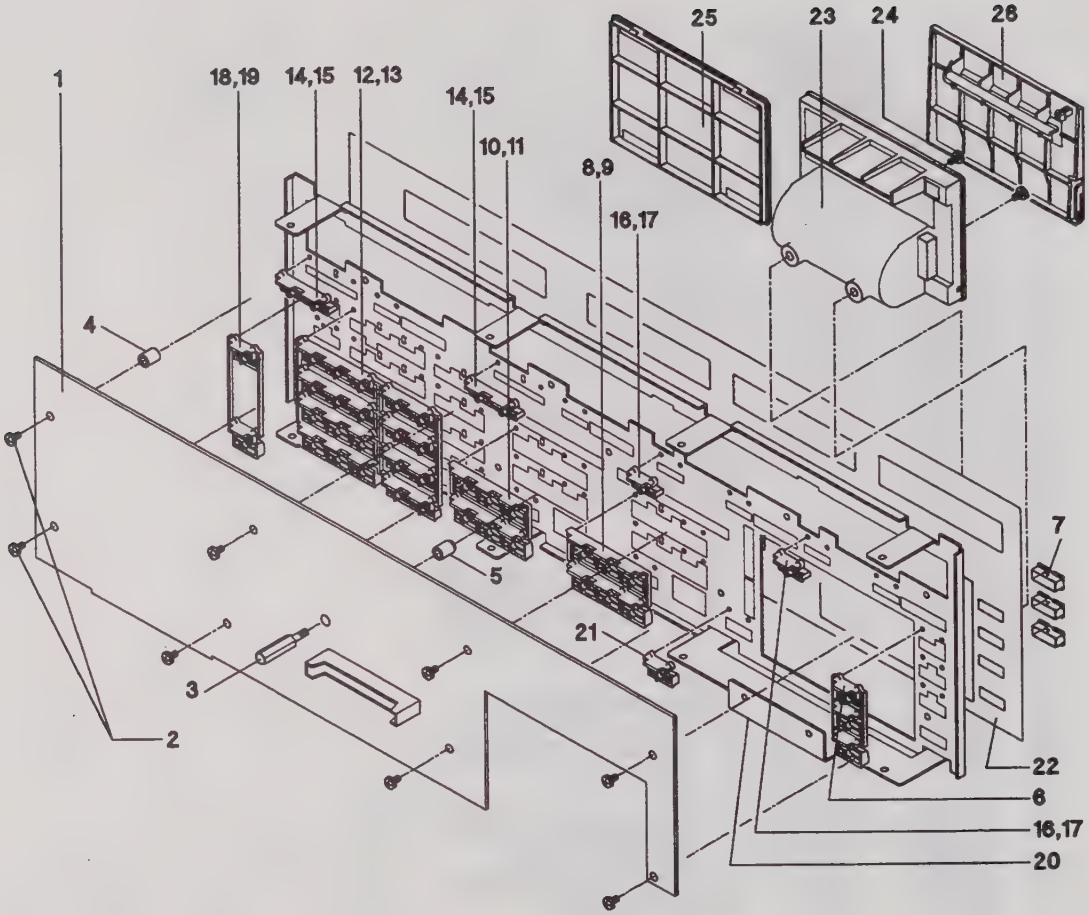
Item	Part No.	Qty Model 253610	253620	253630	253640	Description
1	B9284CG	1	1	1	1	Chassis
2	B9284GR	1	1	1	1	Rear Sheet
3	A1360JS	1	1	1	1	Socket & Holder
4	Y9305EB	2	2	2	2	F.H.Screw, M3x5
5	A9174ZH	1	1	1	1	Terminal
6	Y9401CB	2	2	2	2	Nut M4
7	Y9401WL	1	1	1	1	Toothed Lockwasher
8	B9284CH	1	1	1	1	Frame Assembly
9	Y9305LB	9	9	9	9	B.H.Screw, M3x5
10	B9284PB		1	1	1	Mother Board Assembly } (select)
	B9284PC	1				Mother Board Assembly } (select)
11	Y9305LB	9	9	9	9	B.H.Screw, M3x5
12	A1120MN	1	1	1	1	Magnetic Part
13	A1121MN	1	1	1	1	Magnetic Part
14	Y9305LB	1	1	1	1	B.H.Screw, M3x5
15	B9292CE	9	9	9	9	Spacer
16	B9294PH		1	1	1	DC Power Board Assembly
17	B9294PH	1		1	1	DC Power Board Assembly
18	B9294PH		1	1	1	DC Power Board Assembly
19	A1018EP	2	2	2	2	Clamp
20	A9117KY	5	5	5	5	Clamp
21	B9284DK	1	1	1	1	Printer Assembly *1,*2
22	B9293UK	1	1	1	1	Printer Mecha. *1,*2
23	Y9204KB	3	3	3	3	B.H.Screw, M2.3x4 *1,*2
24	B9284DL	1	1	1	1	Bracket *1,*2
25	B9293PK	1	1	1	1	Printer Board Assembly *1,*2
26	Y9305LB	2	2	2	2	B.H.Screw, M3x5 *1,*2
27	B9293LB	1	1	1	1	Flat Cable *1,*2
28	B9293LC	1	1	1	1	Cable Assembly *1,*2
29	B9284GF	1	1	1	1	Power Assembly
30	B9293VP	1	1	1	1	Power Supply
31	Y9305LB	4	4	4	4	B.H.Screw, M3x5
32	A1642SB	1	1	1	1	Push Switch
33	A9818XK	1	1	1	1	Tube
34	Y9305LB	2	2	2	2	B.H.Screw, M3x5
35	Y9250ET	1	1	1	1	Retaining Ring
36	A9102ZG	1	1	1	1	Knob
37	B9284PS	1	1	1	1	Waveform Assembly *3
38	B9284PT				1	Motor Assembly
39	B9284PE	1	1	1	1	DSP Assembly

Note:

*1 2536 □□ – 1 –/B5
*2 2536 □□ – 5 –/B5
*3 2536 □□ – /WF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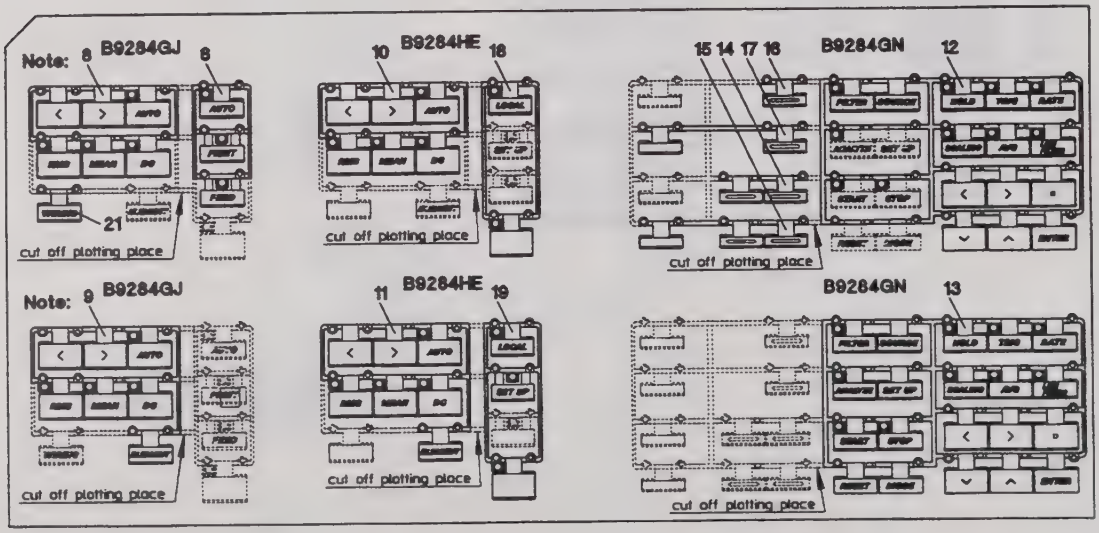
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B9284GN
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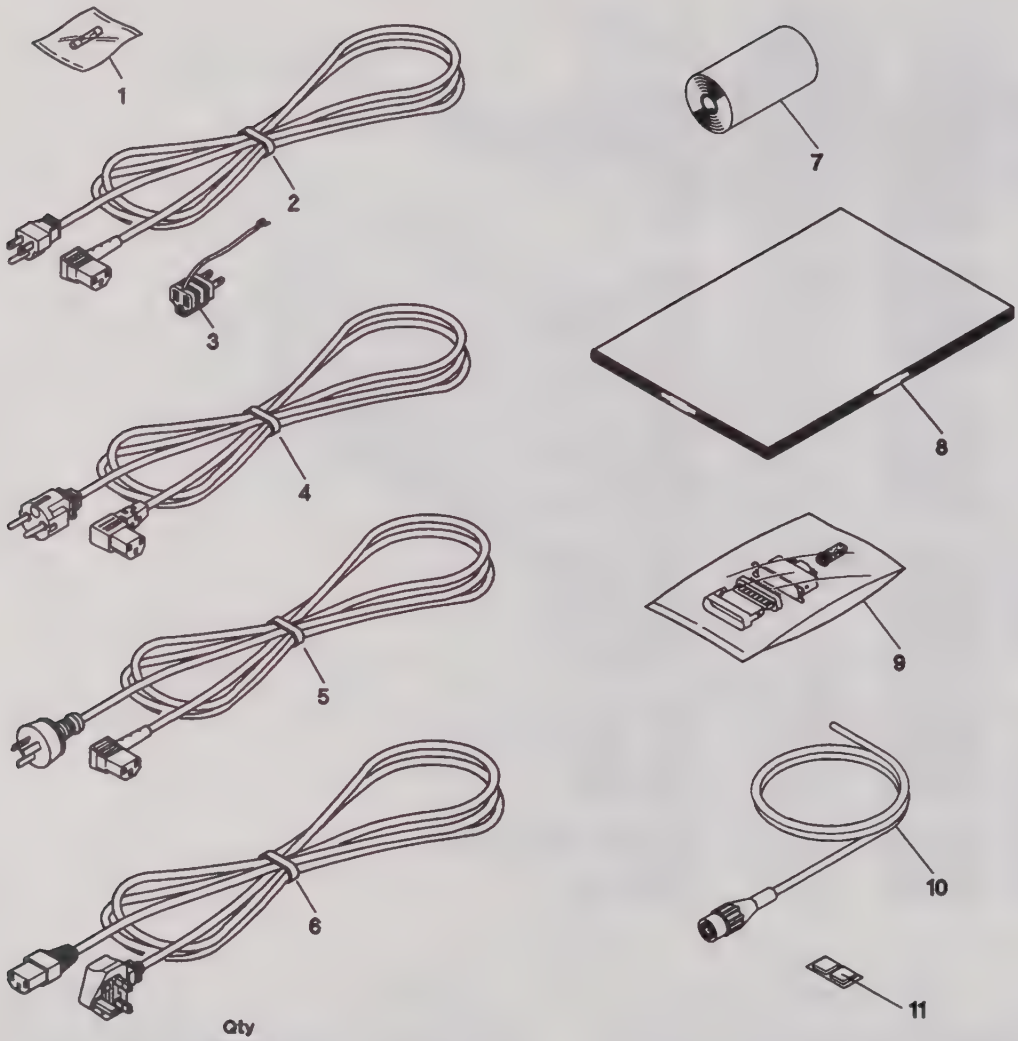
Item	Part No.	Model	Qty 253610	253620	253630	253640	Description
1	B9284PF		1	1	1	1	Display Board Assembly
2	Y9310LB		8	8	8	8	B.H. Screw, M3x10
3	B9284CT		1	1	1	1	Stud
4	B9314CP		8	8	8	8	Stud
5	B9314CN		1	1	1	1	Stud
6	B9284GJ			1	1	1	Knob
7	A9099ZM		–	–	–	–	Cover (select)
8	B9284GJ		1				Knob } (select)
9	B9284GJ			1	1	1	Knob } (select)
10	B9284HE		1				Knob } (select)
11	B9284HE			1	1	1	Knob } (select)
12	B9284GN		1				Knob } (select)
13	B9284GN			1	1	1	Knob } (select)
14	B9284GN		2				Knob } (select)
15	B9284GN			2	2	2	Knob } (select)
16	B9284GN		2				Knob } (select)
17	B9284GN			2	2	2	Knob } (select)
18	B9284HE		1	1	1		Knob } (select)
19	B9284HE					1	Knob } (select)
20	B9284GQ		1	1	1	1	Front Panel
21	B9284GJ		1	1	1	1	Knob
22	B9284GL		1				Front Sheet } (select)
	B9284GK			1	1		Front Sheet } (select)
	B9284GM					1	Front Sheet } (select)
23	A9097ZM		1	1	1	1	Cover (/B5)
24	Y9305LB		2	2	2	2	B.H.Screw, M3x5 (/B5)
25	A9098ZM		1	1	1	1	Cover
26	A9096ZM		1	1	1	1	Cover (/B5)



Item	Part No.	Qty Model 253610	253820	253630	253640	Description
1	A1174EF	1	1	1	1	Fuse *6 } (select)
	A1452EF	1	1	1	1	Fuse *7 }
2	A1006WD	1	1	1	1	Power Supply Cord(UL,CSA standard) *1,*2
3	A1253JZ	1	1	1	1	3P-2P Adapter *1
4	A1009WD	1	1	1	1	Power Supply Cord(VDE standard) *3
5	A1024WD	1	1	1	1	Power Supply Cord(SAA standard) *5
6	A1023WD	1	1	1	1	Power Supply Cord(BS standard) *4
7	B9293UA	1	1	1	1	Printer Paper *8
8	–	1	1	1	1	Instruction Manual
9	A1005JD	1	1	1	1	Connector
10	B9284LK	1	2	3	3	Cable Assembly
11	A9088ZM	1	1	1	1	Stopper

Note:

*1	2536 □□ – □ –M
*2	2536 □□ – □ –D
*3	2536 □□ – □ –F
*4	2536 □□ – □ –J
*5	2536 □□ – □ –R
*6	2536 □□ – 01
*7	2536 □□ – 05
*8	2536 □□ – /B5

Appendix List of Manufacturers of Electronic Parts

MFR Abbreviation	MFR Name	Address
ASAHI ELEC	Asahi Electric Co., Ltd.	Dairoku Hakuo Bldg.(3F) 2-2-13 Nishi-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
ASAHI	Asahi Electric Works Ltd.	1-7-24 Kokutaiji-cho, Naka-ku, Hiroshima-shi, Hiroshima, 730 JAPAN
ALPHA ELEC	Alpha Electronics Corp.	3K Bldg. 2-4-7 Kajiya-cho, Chiyoda-ku, Tokyo, 101 JAPAN
AKK	Asakura Kogyo Co., Ltd.	4-10-7 Daimachi, Hachioji-shi, Tokyo, 193 JAPAN
AKS	Akabane Kinzoku Seisakusho K.K.	2-16-4 Akabane-minami, Kita-ku, Tokyo, 115 JAPAN
ALF	Alpha Co., Ltd.	4-5-5 Hino-honmachi, Hino-shi, Tokyo, 191 JAPAN
ALPS	Alps Electric Co., Ltd.	1-7 Yukigayaotsuka-cho, Ota-ku, Tokyo, 145 JAPAN
AMP	AMP Japan Ltd.	87 Hisamoto, Takatsu-ku, Kawasaki-shi, Kanagawa, 213 JAPAN
AD	Analog Devices	Jibiki Daini Bldg. 4-7-8 Kojimachi, Chiyoda-ku, Tokyo, 102 JAPAN
ANR	Anritsu Corp.	5-10-27 Minami-azabu, Minato-ku, Tokyo, 106 JAPAN
ANRITSU	Anritsu Meter Co., Ltd.	2-4-5 Shimo-meguro, Meguro-ku, Tokyo, 153 JAPAN
BB	Burr-Brown Japan Ltd.	Natural House Bldg.(2F) 6-14-15 Akasaka, Minato-ku, Tokyo, 107 JAPAN
CDK	Chitose Electric Co., Ltd.	1-13-16 Izumi, Komae-shi, Tokyo, 201 JAPAN
CJK	Coaning Japan K.K.	Kowa 35 Bldg.(3F) 1-14-14 Akasaka, Minato-ku, Tokyo, 107 JAPAN
CKD	CKD Corp.	Sumitomo-bank Nihon-ichi Bldg. 1-17-17 Nihonbashi, Minami-ku, Osaka-shi, Osaka, 542 JAPAN,
TOCOS	Tokyo Cosmos Electronics Co., Ltd.	2-268 Sobudai, Zama-shi, Kanagawa, 228 JAPAN
CPH	Kureha Plastics Co., Ltd.	2221 Oaza-Kamitamari, Tamari-mura, Niihari-gun, Ibaragi, 311-34 JAPAN
COPAL	Copal Electronics Co., Ltd.	Daigo Mori Bldg. 1-17-1 Toranomon, Minato-ku, Tokyo, 105 JAPAN
CITIZEN	Citizen Watch Co., Ltd.	840 Shimotomi, Tokorozawa-shi, Saitama, 359 JAPAN
DAI	Dainichi Denshi Co., Ltd.	Dainichi Bldg. 1-1-7 Koraku, Bunkyo-ku, Tokyo, 112 JAPAN
DDK	Daiichi Denshi Kogyo Ltd.	Heiwaseimei Fuchu Bldg.(2F) 1-4 Hachiman Fuchu-shi, Tokyo, 183 JAPAN
DIC	Dainippon Ink & Chemicals, Inc.	3-7-20 Nihonbashi, Chuo-ku, Tokyo, 103 JAPAN
DAIICHI	Daiichi Denzai K.K.	3-4-14 Higashi-nogawa, Komae-shi, Tokyo, 201 JAPAN
DAITO	Daitou Tsushinki Co., Ltd.	2-17-7 Shimo-meguro, Meguro-ku, Tokyo, 153 JAPAN
DENKIKAGA	Denki Kagaku Kogyo K.K.	1-4-1 Yuraku-cho, Chiyoda-ku, Tokyo, 100 JAPAN
DSK	Daiwa Sanko Co., Ltd.	2-9-10 Soto-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
DATEL	Datel Inc.	Meijiseimei Bldg. 2-27-4 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
EIE	EIE Co., Ltd.	5-1-7 Ginza, Chuo-ku, Tokyo, 104 JAPAN
ELCO INTER	Elco International Corp.	CBC Kokusai Bldg.(6F) 3-22-7 Shiba, Minato-ku, Tokyo, 105 JAPAN
ELM	Elma Electronics A.G.	2-4-5 Kajiya-cho, Chiyoda-ku, Tokyo, 101 JAPAN
ELNA	Elna Co., Ltd.	Gotanda K Bldg.(4F) 2-21-1 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
ELMEC	Elmec Corp.	KSP-R&D-B-10F 100-1 Sakado, Takatsu-ku, Kawasaki-shi, KANAGAWA, 213 JAPAN
SEIKO EPSON	Epson Hanbai Co., Ltd.	Hatsudai Koyama Bldg., 1-53-6 Hatsudai, Shibuya-ku, Tokyo, 151 JAPAN
FURUKAWA	The Furukawa Battery Co., Ltd.	Osaka-shi, Osaka, 550 JAPAN
FCH	Fairchild Aschlumberger Company	464 Ellis street, Mauntain View, California 94042 U.S.A.
FDK	Fuji Denki Kagaku Co., Ltd.	Hama Gum Bldg. 5-36-11 Shinbashi, Minato-ku, Tokyo, 105 JAPAN
FUJICON	Fujicon Co., Ltd.	3-32-4 Kugahara, Ota-ku, Tokyo, 146 JAPAN
FUJI	Fuji Electric Co., Ltd.	Shin Yurakucho Bldg. 1-12-1 Yuraku-cho, Chiyoda-ku, Tokyo, 100 JAPAN
FUJISOKU	Fujisoku Electric Co., Ltd.	Yushima Fuji Bldg.(5F) 3-13-8 Yushima, Bunkyo-ku, Tokyo, 113 JAPAN
FUJITSU	Fujitsu Ltd.	Furukawa Sougou Bldg., 2-6-1 Marunouchi, Chiyoda-ku, Tokyo, 100 JAPAN
FKK	Fujikura Kasei Co., Ltd.	2-6-15 Shiba-koen, Minato-ku, Tokyo, 105 JAPAN
FUJIKURA	Fujikura Cable Works, Ltd.	1-5-1 Kiba, Koto-ku, Tokyo, 135 JAPAN
FUJI POLYM	Fuji Polimertech Corp.	4-8-16 Nihonbashi-honcho, Chuo-ku, Tokyo, 103 JAPAN
FSH	Fusoh Co., Ltd.	501 TBR Bldg. 2-10-2 Nagata-cho, Chiyoda-ku, Tokyo, 100 JAPAN

MFR Abbreviation	MFR Name	Address
GEC	Gokoh Electric Co., Ltd.	6-18-12 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
GJK	Grace Japan K.K.	100 Kaneda, Atsugi-shi, Kanagawa, 243 JAPAN
GSI	General Semiconductor Industries, Inc.	2001 West 10th Place Tempe Arizona 85281 U.S.A.
HAK	Hakko Co., Ltd.	1-10-6 Takaban, Meguro-ku, Tokyo, 152 JAPAN
HAMAI	Hamai Electric Lamp Ind. Co., Ltd.	1-9-26 Kasuga, Bunkyo-ku, Tokyo, 112 JAPAN
HCC	Hitachi Chemical Co., Ltd.	Shinjuku Mitsui Bldg. 2-1-1 Nishi-shinjuku, Shinjuku-ku, Tokyo, 160 JAPAN
HITACHI, D	Hitachi Cable, Ltd.	2-1-12 Marunouchi, Chiyoda-ku, Tokyo, 100 JAPAN
HDK	Hokuriku Electric Ind. Co., Ltd.	102 Oya Bldg. 1-4-11 Tamadaira, Hino-shi, Tokyo, 191 JAPAN
HEC	Hosiden Electronics Co., Ltd.	1-4-33 Kitakyuhoji, Yao-shi, Osaka, 581 JAPAN
HIROSE	Hirose Electric Co., Ltd.	5-5-23 Osaki, Shinagawa-ku, Tokyo, 141 JAPAN
HITACHI	Hitachi Ltd.	Shinmaru Bldg. 1-5-1 Marunouchi, Chiyoda-ku, Tokyo, 100 JAPAN
HKD	Hakko Electric Corp.	257-1 Oaza-narushima, Tatebayashi-shi, Gunma, 374 JAPAN
HKS	Hakko Shoji Co., Ltd.	1-7-9 Kami-meguro, Meguro-ku, Tokyo, 153 JAPAN
HML	Hitachi Maxell, Ltd.	1-1-88 Ushitora, Ibaraki-shi, Osaka 567 JAPAN
HONDA	Honda Tsushin Kogyo Co., Ltd.	6-18-12 Meguro-honcho, Meguro-ku, Tokyo, 152 JAPAN
HOS	H,OS Co., Ltd.	Okumiya Kosan Bldg.(4F) 3-7-3 Soto-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
HOSODA	Hosoda & Co., Ltd.	Ishikawa Bldg.(2F) 2-8-5 Ginza, Chuo-ku, Tokyo, 104 JAPAN
HANAI	Hanai Densen	2-11-5 Sakura-shinmachi, Setagaya-ku, Tokyo, 154 JAPAN
HZT	Hertz Technology Inc.	293-4 Sanda-cho, Hachioji-shi, Tokyo, 193 JAPAN
IZUMI	Izumi Denki Corp.	6-1-1 Heiwajima, Ota-ku, Tokyo, 143 JAPAN
IWATSU	Iwatsu Electronics Co., Ltd.	Daini Matsuda Bldg. 3-4-8 Toranomon, Minato-ku, Tokyo, 105 JAPAN
IEI	Ikuno Electrol Inc.	88 Komaoka-cho, Tsurumi-ku, Yokohama-shi, Kanagawa, 230 JAPAN
IFK	Ishifuku Metal Ind. Co., Ltd.	3-20-7 Uchi-kanda, Chiyoda-ku, Tokyo, 101-91 JAPAN
IKEGAMI	Ikegami Tsushinki Co., Ltd.	5-6-16 Ikegami, Ota-ku, Tokyo, 146 JAPAN
INC	Inter Compo Inc.	ICI Bldg. 1-6-7 Shibuya, Shibuya-ku, Tokyo, 150 JAPAN
INTEL	Intel Japan K.K.	Shinmaru Bldg. 1-5-1 Marunouchi, Chiyoda-ku, Tokyo, 100 JAPAN
IOE	IOE	Maruki Bldg.(5F) 1-13-7 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
ISKA	Ishikawa Seisakusho	6-3-5 Toshima, Kita-ku, Tokyo, 114 JAPAN
ISKB	Ishikawa Seisakusho	4-7-5 Soto-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
ISHIZUKA	Ishizuka Electronics Corp.	1-7-7 Kinshi, Sumida-ku, Tokyo, 130 JAPAN
ISS	Ikura Seiki Seisakusho Co., Ltd.	Suzutomo Bldg. 1-25-5 Higashi-ueno, Taito-ku, Tokyo, 110 JAPAN
IST	Iwatsu Electric Co., Ltd.	Asahiseimei Kaikan-nai 2-1-3 Nihombashi, Chuo-ku, Tokyo, 103 JAPAN
ITE	Iwata Electric Co., Ltd.	Kanazawa Bldg. 4-6-13 Shimo-ochiai, Shinjuku-ku, Tokyo, 161 JAPAN
ITFA	Interface	1-1-25 Minami-kaniya, Minami-ku, Hiroshima-shi, Hiroshima, 732 JAPAN
ITFB	Interface	1-2-3-4 Toyoda, Suwa-shi, Nagano, 392 JAPAN
ITT CANNON	ITT Cannon (Japan)	3014-2 Shinohara-cho, Kohoku-ku, Yokohama-shi, Kanagawa, 222 JAPAN
IWT	Iwata Denko Co., Ltd.	3-32-2 Minami-senzoku, Ota-ku, Tokyo, 145 JAPAN
JAE	Japan Aviation Electronics Industry, Ltd.	1-21-6 Dogenzaka, Shibuya-ku, Tokyo, 150 JAPAN
JDI	Japan Drive-it Co., Ltd.	8-10 Denenchofu, Ota-ku, Tokyo, 145 JAPAN
JMC	Japan Macnics Corp.	1-22-2 Hakusan High-tech Park, Midori-ku, Yokohama-shi, Kanagawa, 226 JAPAN
JPC	Jepico Corp.	Shinjukuku Daiichiseimei Bldg.(4F) 2-7-1 Nishi-shinjuku, Shinjuku-ku, Tokyo, 163 JAPAN
JRC	Japan Radio Co., Ltd.	2-17-22 Akasaka, Minato-ku, Tokyo, 105 JAPAN
JRM	Japan Resister Mfg. Co., Ltd.	3-6-20 Minami-oi, Shinagawa-ku, Tokyo, 140 JAPAN
NIHONSERVO	Japan Servo Co., Ltd.	Kanda Daini Chuo Bldg. 7 Kanda-Mitoshiro-cho, Chiyoda-ku, Tokyo, 101 JAPAN
JUNKOSHA	Junkosha Co., Ltd.	2-25-25 Miyasaka, Setagaya-ku, Tokyo, 156 JAPAN
KBK	Kyokuto Boeki Kaisha, Ltd.	Shin-otemachi Bldg.(7F) 2-2-1 Otemachi, Chiyoda-ku, Tokyo, 100-91 JAPAN
KCC	Kokusai Chart Corp.	798 Futatsumiya, Ageo-shi, Saitama, 362 JAPAN
KYOURITSU	Kyoritsu Dengyo Co., Ltd.	2-1-5 Higashi-nakano, Nakano-ku, Tokyo, 164 JAPAN

MFR Abbreviation	MFR Name	Address
KAWASAKI	Kawasaki Densen Co., Ltd.	498 Sakado, Takatsu-ku, Kawasaki-shi, Kanagawa, 213 JAPAN
KAMAYA	Kamaya Electric Co., Ltd.	3515 Kami-wada, Yamato-shi, Kanagawa, 242 JAPAN
KEI	Kokusai Electronics Corp.	5-34-10 Minamidai, Nakano-ku, Tokyo, 164 JAPAN
KEK	Kaigai Electronics Inc.	2-2-5 Roppongi, Minato-ku, Tokyo, 106 JAPAN
KEL	KEL Corp.	6-17-7 Nagayama, Tama-shi, Tokyo, 206 JAPAN
KYOSAN	Kyosan Electric Mfg. Co., Ltd.	3-4-2 Marunouchi, Chiyoda-ku, Tokyo, 100 JAPAN
KEW	Koro Electric Works Ltd.	4-22-2 Nogata, Nakano-ku, Tokyo, 165 JAPAN
KITAGAWA	Kitagawa Ind. Co., Ltd.	Sengoku Bldg.(6F) 2-4-26 Nihonbashi-muromachi, Chuo-ku, Tokyo, 103 JAPAN
KJO	Kinjyo Denki K.K.	2-12-2 Tamadaira, Hino-shi, Tokyo, 191 JAPAN
KKK	Kenden Kogyo K.K.	4-24-5 Chihaya, Toshima-ku, Tokyo, 171 JAPAN
KAKIZAKI	Kakizaki Mfg. Co., Ltd.	1-18-2 Nishi-ikebukuro, Toshima-ku, Tokyo, 171 JAPAN
KIMUDEN	Kimura Denki Co., Ltd.	1-33-10 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
KMS	Katsuragawa Machine Screw Ltd.	3-24-1 Yaguchi, Ota-ku, Tokyo, 146 JAPAN
KOA	KOA Corporation	3-2-3 Ebisu, Shibuya-ku, Tokyo, 150 JAPAN
KPM	Kawakami Paint Mfg. Co., Ltd.	2-41-1 Tsukaguchi-honcho, Amagasaki-shi, Hyogo, 661 JAPAN
KSC	Koyo Seiko Co., Ltd.	7-11-15 Ginza, Chuo-ku, Tokyo, 103 JAPAN
KSD	Kyosai Denki K.K.	1606 Yamada-cho, Hachioji-shi, Tokyo, 193 JAPAN
KSS	KS Sangyo Co., Ltd.	3-17-3 Kuramae, Taito-ku, Tokyo, 111 JAPAN
KINSEKI	Kinseki Co., Ltd	1-8-1 Izumihoncho, Komae-shi, Tokyo, 201 JAPAN
KSBECT	KS Vector Co., Ltd.	Pearl Bldg. 3-15-5 Shibuya, Shibuya-ku, Tokyo, 150 JAPAN
KSW	Kato Spring Works Co., Ltd.	1-1-3 Higashi-tabatacho, Kita-ku, Tokyo, 114 JAPAN
KTK	Kyoei Tsushin Kogyo Co., Ltd.	3-1-7 Higashi, Shibuya-ku, Tokyo, 150 JAPAN
KYOUWA	Kyowa Electronic Instrument Co., Ltd.,	2-3-8 Toranomon, Minato-ku, Tokyo, 105 JAPAN
KWT	Kawate Corp.	15-2 Nakajuku, Itabashi-ku, Tokyo, 173 JAPAN
KYOCERA	Kyocera Corp.	5-22 Kita-inouecho, Higashino, Yamashina-ku, Kyoto-shi, Kyoto, 607 JAPAN
KYK	Kinzoku Youzai Co., Ltd.	4-18-15 Nogata, Nakano-ku, Tokyo, 165 JAPAN
LINEARTECH	Liner Technology Corporation	1630 McCarthy Bldg., Milpitas, CA 95035 U.S.A.
MAC 8	Mac Eight Co., Ltd.	1811 Komaoka-cho, Tsurumi-ku, Yokohama-shi, Kanagawa, 230 JAPAN
MATSUDENKO	Matsushita Denko Co., Ltd.	177 Nozaki-cho, Mitaka-shi, Tokyo, 181 JAPAN
MATSUDENSHI	Matsushita Electronic Ind. Co., Ltd.	National Bldg.(1-9F) 1-1-2 Shibakoen, Minato-ku, Tokyo, 105 JAPAN
MCI	Matsushita Communication Industrial Co., Ltd.	4-3-1 Tsunashima-higashi, Kohoku-ku, Yokohama-shi, Kanagawa, 223 JAPAN
MICRON	Micron Electric Co., Ltd.	786 Futoo-cho, Kohoku-ku, Yokohama-shi, Kanagawa, 222 JAPAN
MDR	Midoriya Electric Co., Ltd.	Shuzui Bldg. 2-7-19 Kyobashi, Chuo-ku, Tokyo, 104 JAPAN
MATSUO	Matsuo Electric Co., Ltd.	1-34-20 Higashi-shinagawa, Shinagawa-ku, Tokyo, 140 JAPAN
MECS	Matsubo Electronic Conpoments Sales Co., Ltd.	Nitto Hoshino Bldg.(3F) 8-11-1 Nishi-shinjuku, Shinjuku-ku, Tokyo, 162 JAPAN
MHC	Matsukyu Co., Ltd.	4-6-7 Nishi-shinkoiwa, Katsushika-ku, Tokyo, 124 JAPAN
MITSUBISHI	Mitsubishi Electric Co., Ltd.	2-2-3 Marunouchi, Chiyoda-ku, Tokyo, 100 JAPAN
MIZUDEN	Mizutani Electric Ind. Co., Ltd.	Daigo Azuma Bldg.(3F) 3-38 Kanda-sakumacho, Chiyoda-ku, Tokyo, 101 JAPAN
MKK	Matsui Co., Ltd.	2-5-5 Hamamatsu-cho, Minato-ku, Tokyo, 105 JAPAN
MKS	Meikosha Co., Ltd.	6-8-19 Shimo-meguro, Meguro-ku, Tokyo, 153 JAPAN
MURATA	Murata Mfg. Co., Ltd.	3-26-11 Nishi-rokugo, Ota-ku, Tokyo, 144 JAPAN
3M	Sumitomo 3M Co., Ltd.	7-1-21 Akasaka, Minato-ku, Tokyo, 107 JAPAN
MIDORI	Midori Precisions Co., Ltd.	2-11-2 Yakumodai, Chofu-shi,Tokyo, 182 JAPAN
MPI	Mitsubishi Plastics Industries Ltd.	2-5-2 Marunouchi, Chiyoda-ku, Tokyo, 100 JAPAN
MRR	Moririca Electronics Co., Ltd.	3321 Izumi-cho, Izumi-ku, Yokohama-shi, Kanagawa, 244 JAPAN
MRY	Moroyama Electric Co., Ltd.	295 Hongo, Moroyama-cho, Iruma-gun, Saitama, 350-04 JAPAN
MSS	Musashi Electric Co., Ltd.	8-20-36 Ginza, Chuo-ku, Tokyo, 104 JAPAN
MTN	Matano K.K.	863-2 Komiya-cho, Hachioji-shi, Tokyo, 192 JAPAN
MOTOROLA	Nihon Motrola Ltd.	3-20-1 Minami-azabu, Minato-ku, Tokyo, 106 JAPAN
MTR	Matsuraya Co., Ltd.	Tokyo Oroshiuri Center Bldg.(9F) 7-22-7 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
MTT	MTT Co., Ltd.	11-4 Sanei-cho, Shinjuku-ku, Tokyo, 160 JAPAN
MIYAMA	Miyama Electric Co., Ltd.	4-7-1 Kamiikedai, Ota-ku, Tokyo, 145 JAPAN
N. ALEPH	Nippon Aleph Corp.	88 Komaoka-cho, Tsurumi-ku, Yokohama-shi, Kanagawa, 230 JAPAN

MFR Abbreviation	MFR Name	Address
NAL	Nihon Almit Co., Ltd.	Miyata Bldg.(6F) 1-38 Yoyogi, Shibuya-ku, Tokyo, 151 JAPAN
NBA	Burndy Japan Ltd.	3-26-33 Takanawa, Minato-ku, Tokyo, 108 JAPAN
NBT	Nihon Battery Co., Ltd.	1-8-1 Nishi-shinbashi, Minato-ku, Tokyo, 105 JAPAN
NCC	NCC International	Matsunaga Bldg. 1-6-6 Soto-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
NICHICON	Nichicon Capacitor Ltd.	Toshin 24 Omori Bldg.(5F) 1-6-8 Omori-kita, Ota-ku, Tokyo, 143 JAPAN
NITSUCHEMI	Nippon Chemi-con Corp.	1-167-1 Higashi-Ome, Ome-shi, Tokyo, 198 JAPAN
NDC	Nitto Denko Corp.	1-1-2 Shimo-hozumi, Ibaraki-shi, Osaka, 567 JAPAN
NDK	Nikko Denshi Kogyo Co., Ltd.	3-9-29 Midorigaoka, Meguro-ku, Tokyo, 152 JAPAN
NIHONDENPA	Nihon Denpa	Shinwa Bldg. 3-2-4 Nishi-shinjuku, Shinjuku-ku, Tokyo, 160 JAPAN
N. DENYO	Nippon Denyo Co., Ltd.	3-9-11 Sengen-cho, Fuchu-shi, Tokyo, 183 JAPAN
NEC	Nippon Electric Co., Ltd.	5-33-1 Shiba, Minato-ku, Tokyo, 108 JAPAN
NAGASAWA	Nagasawa Electric Works Ltd.	5-8-8 Yoyogi, Shibuya-ku, Tokyo, 151 JAPAN
NGK	NGK Insulators Ltd.	Shin-maru Bldg.(2F) 1-5-1 Marunouchi, Chiyoda-ku, Tokyo, 100 JAPAN
NIC	Nichiban Co., Ltd.	2-2-4 Kudan-minami, Chiyoda-ku, Tokyo, 102 JAPAN
JIR	Nihon Inter Electronics Corp.	4-7-15 Myojin-cho, Hachioji-shi, Tokyo, 193 JAPAN
NIP DEN	Nippon Thermo Co., Ltd.	1727-1 Takada-cho, Kohoku-ku, Yokohama-shi, Kanagawa, 223 JAPAN
NISSHO	Nissho Electric	1-16 Kotobuki-cho, Toyota-shi, Aichi, 471 JAPAN
NAGANO JRC	Nagano Japan Radio Co., Ltd.	1163 Shimohigano, Inasato-cho, Nagano-shi, Nagano, 381-21 JAPAN
NIKKAI	Nihon Kaiheiki Ind. Co., Ltd.	1-5-14 Minami-magome, Ota-ku, Tokyo, 143 JAPAN
NIKKOHM	Nikkohm Co., Ltd.	Ono Bldg.(4F) 3-9-10 Nihonbashi-kayabacho, Chuo-ku, Tokyo, 103 JAPAN
N. KOUDEN	Nippon Light Metal Co., Ltd.	3-13-12 Mita, Minato-ku, Tokyo, 108 JAPAN
MOLEX	Nihon Molex	785 Fukami-suwa, Yamato-shi, Kanagawa, 242 JAPAN
NMR	Nippon Miniature Rope Co., Ltd.	Ikeda Bldg.(2F) 5-15 Nihonbashi-hakozakicho, Chuo-ku, Tokyo, 103 JAPAN
NOD	Node Corp.	1-30-20 Higashi-magome, Ota-ku, Tokyo, 143 JAPAN
NOF	Nippon Oil & Fats Co., Ltd.	1-10-1 Yuraku-cho, Chiyoda-ku, Tokyo, 100 JAPAN
NIHONPULSE	Nippon Pulse Motor Co., Ltd.	2-16-13 Hongo, Bunkyo-ku, Tokyo, 113 JAPAN
JRC	New Japan Radio Co., Ltd.	1-22-14 Toranomon, Minato-ku, Tokyo, 105 JAPAN
NSB	Nisshinbo Industries, Inc.	3-10 Nihonbashi-Yokoyamacho, Chuo-ku, Tokyo, 103 JAPAN
NS	National Semiconductor Japan Ltd.	4-15 Nishi-shinjuku, Shinjuku-ku, Tokyo, 160 JAPAN
NSSA	Nakagawa Seisakusho K.K.	302-2 Takegahana-nishimachi, Matsudo-shi, Chiba, 271 JAPAN
NSSB	Nakagawa Seisakusho K.K.	2-15-4 Kyojima, Sumida-ku, Tokyo, 131 JAPAN
NSM	Nakagawa Mfg. Co., Ltd.	2-5-21 Nishiki-cho, Warabi-shi, Saitama, 335 JAPAN
NIHON T&B	Nihon Thomas & Betts Ltd.	Dai 44 Kowa Bldg. 1-2-7 Higashiyama, Meguro-ku, Tokyo, 153 JAPAN
NITTOKU	Shin Nittoku Electric Co., Ltd.	1181-1 Oaza-Obuse, Obuse-machi, Kamitakai-gun, Nagano, 381-02 JAPAN
TI	TEXAS Instrument Japan Ltd.	Aoyama Fuji Bldg. 3-6-12 Kita-aoyama, Minato-ku, Tokyo 107 JAPAN
NITSUKO	Nitsuko Corp.	260 Kita-mikata, Takatsu-ku, Kawasaki-shi, Kanagawa, 213 JAPAN
NTN	NTN Toyo Bearing Co., Ltd.	1-3-17 Kyomachibori, Nishi-ku, Osaka-shi, Osaka, 550 JAPAN
NTS	Nitto Shokai Co., Ltd.	Nito Bldg. 2-20-27 Takanawa, Minato-ku, Tokyo, 108 JAPAN
VISHAY	Nippon Vishay Co., Ltd.	4-15-4 Hara-machida, Machida-shi, Tokyo, 194 JAPAN
NVI	Nippon Valqua Industries, Ltd.	Marukane Bldg. 1-1-1 Asahi-cho, Kawasaki-ku, Kawasaki-shi, Kanagawa, 210 JAPAN
ORIGIN	Origin Electric Co., Ltd.	1-18-1 Takada, Toshima-ku, Tokyo, 171 JAPAN
OSHINO	Oshino Electric Lamp Works Ltd.	2-5-2 Minami-shinagawa, Shinagawa-ku, Tokyo, 140 JAPAN
ORIENTAL	Oriental Motor Co., Ltd.	2-21-11 Kojima, Taito-ku, Tokyo, 111 JAPAN
OFC	Okada Finish and Coating Co., Ltd.	349-1 Homura-nakanobun, Yoshikawa-machi, Kitakatsushika-gun, Saitama, 342 JAPAN
OKAYA	Okaya Electric Ind. Co., Ltd.	Shibuya Yasuda Bldg. 1-8-3 Shibuya, Shibuya-ku, Tokyo, 150 JAPAN
OKI	Oki Electronics Co., Ltd.	4-3-13 Toranomon, Minato-ku, Tokyo, 105 JAPAN
OKITA	Okita Works Co., Ltd.	Shindaiso Bldg.(2-14F) 2-10-7 Dogenzaka, Shibuya-ku, Tokyo, 150 JAPAN
OMC	Okazaki Mfg. Corp.	New Toyo Bldg.(5F) 1-1-15 Moto-akasaka, Minato-ku, Tokyo, 107 JAPAN
OMD	Omori Denki Seisakusho Co., Ltd.	2-15-16 Naka-ikegami, Ota-ku, Tokyo, 145 JAPAN
ORC	Okayama Rubber Co., Ltd.	3-34-7 Hongo, Bunkyo-ku, Tokyo, 113 JAPAN

MFR Abbreviation	MFR Name	Address
OMRON	Omron Corp.	Nissei Bldg.(15F) 1-6-3 Osaki, Shinagawa-ku, Tokyo, 141 JAPAN
PCN	PCN Corp.	Shin-yokohama Bldg.(9F) 3-19-11 Shin-yokohama, Kohoku-ku, Yokohama-shi, Kanagawa, 222 JAPAN
PMI	Nippon PMI Corp.	Time 24 Bldg. 35 Tansu-cho, Shinjuku-ku, Tokyo, 162 JAPAN
CHUOMUSEN	Chuo Musen Co., Ltd.	1-9-12 Omori-nishi, Ota-ku, Tokyo, 143 JAPAN
RICOH	Ricoh Denshi Co., Ltd.	Shinpo Bldg.(4F) 6-13-7 Ginza, Chuo-ku, Tokyo, 104 JAPAN
REW	Riken Electric Wire Co., Ltd.	1-12-22 Tsukiji, Chuo-ku, Tokyo, 104 JAPAN
RIC	Ricoh Co., Ltd.	1-15-5 Minami-aoyama, Minato-ku, Tokyo, 107 JAPAN
RIKEN	Riken Dengu Seizo Co., Ltd.	1-4-5 Higashi-sakashita, Itabashi-ku, Tokyo, 174 JAPAN
ROHM	Rohm Co., Ltd.	5-13 Minami-cho, Hachioji-shi, Tokyo, 192 JAPAN
RPC	Raspac Co., Ltd.	Shin Kyobashi Bldg.(6F) 3-9-4 Kyobashi, Chuo-ku, Tokyo, 104 JAPAN
SAE	Nippon SAE Co., Ltd.	1-34-15 Ebisu-nishi, Shibuya-ku, Tokyo, 150 JAPAN
SANYO	Sanyo Electric Co.	Natsume Bldg. 2-18-8, Yushima, Bunkyo-ku, Tokyo, 113 JAPAN
SCC	Sumitomo Chemical Co., Ltd.	2-7-9 Nihonbashi, Chuo-ku, Tokyo, 103 JAPAN
SCH	H/Schurter	201 Velbethia Jiyugaoka 6-21-12 Okusawa, Setagaya-ku, Tokyo, 158 JAPAN
SAITO CORD	Saito Code Seizo Co., Ltd.	5-19-8 Minami-oi, Shinagawa-ku, Tokyo, 140 JAPAN
SDC	Sanden Kogyo Co., Ltd.	4-2-6 Kamesawa, Sumida-ku, Tokyo, 130 JAPAN
SDK	Sango Denki Kogyo K.K.	1-31-6 Denenchofu, Ota-ku,. Tokyo, 145 JAPAN
SHIBAURA	Shibaura Electronics Co., Ltd.	I¥O Bldg.(3F) 2-38-9 Ikebukuro, Toshima-ku, Tokyo, 171 JAPAN
SEC	Shinko Electric Co., Ltd.	4-11-2 Soto-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
SED	Sanei Electric Co., Ltd.	New Towa Bldg.(1F) 1-5-7 Soto-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
SEI	Sanei Electric Inc.	1-4-5 Nishi-ikebukuro, Toshima-ku, Tokyo, 170 JAPAN
SEIDENSHA	Seidensha Electric Works Ltd.	1-2-23 Hara-machida, Machida-shi, Tokyo, 194 JAPAN
SEH	Sakaguchi Electric Heaters Co., Ltd.	1-12-2 Soto-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
SGT	Sugatsune Kogyo Co., Ltd.	1-8-11 Higashi-kanda, Chiyoda-Ku, Tokyo, 101 JAPAN
SIC	Sekisui-Iko Co., Ltd.	Usami Bldg.(4F) 2-4-14 Uchi-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
SIGNETICS	Signetics Corp.	811 E. Arques Avenue Sunnyvole, California 94088-3409 U.S.A.
SEIKO	Seiko Instruments Inc.	6-31-1 Kameido, Koto-ku, Tokyo, 136 JAPAN
SILICONIX	Siliconix Incorporated.	2201 Laurelwood Road, Santa Clara, CA 95054-1516, U.S.A.
SJDA	Shoji Denki	3-6-17 Soto-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
SJDB	Shoji Denki	3-7-7 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
SENJYU	Senju Kinzoku Kogyo Co., Ltd.	23 Senjuhashido-cho, Adachi-ku, Tokyo, 120 JAPAN
SKB	Showa Highpolymer Co., Ltd.	3-20 Kanda-nishikicho, Chiyoda-ku, Tokyo, 101 JAPAN
SKC	Showa Kosan Co., Ltd.	6-13-18 Akasaka, Minato-ku, Tokyo, 107 JAPAN
SINETSU	Shinetsu Kagaku Kogyo Co., Ltd.	Asahi Tokai Bldg. 2-6-1 Otemachi, Chiyoda-ku, Tokyo, 100 JAPAN
SANKEN	Sanken Electric Co., Ltd.	Ikebukuro Chitose Bldg. 1-22-8 Nishi-ikebukuro, Toshima-ku, Tokyo, 171 JAPAN
SLM	Sumitomo Light Metal Industries, Ltd.	5-11-3 Shinbashi, Minato-ku, Tokyo, 105 JAPAN
SMC	Sanken Microphone Co., Ltd.	2-8-8 Ogikubo, Suginami-ku, Tokyo, 167 JAPAN
SMI	Settsu Metal Industrial Corp.	2-2-2 Taito, Taito-ku, Tokyo, 110 JAPAN
SMK	SMK Corp.	6-5-5 Togoshi, Shinagawa-ku, Tokyo, 142 JAPAN
SMR	Somar Corp.	Marusho Bldg. 4-11-2 Ginza, Chuo-ku, Tokyo, 104 JAPAN
SHINDENGEN	Shindengen Electric Mfg. Co., Ltd.	2-2-1 Otemachi, Chiyoda-ku, Tokyo, 100 JAPAN
SNK	Sankyo Ltd.	Aihara Bldg.(3F) 3-21 Kanda-sakumacho, Chiyoda-ku, Tokyo, 101 JAPAN
SOC	S.O.C. Corp.	1-32-13 Shin-koyasu, Kanagawa-ku, Yokohama-shi, Kanagawa, 221 JAPAN
SOG	Sogo Electronics Co., Ltd.	1-1-3 Kami-saginomiya, Nakano-ku, Tokyo, 165 JAPAN
SONY	Sony Corp.	6-7-35 Kita-shinagawa, Shinagawa-ku, Tokyo, 141 JAPAN
SOSHIN	Soshin Electric Co., Ltd.	1-18-18 Naka-magome, Ota-ku, Tokyo, 143 JAPAN
SPC	SPC Electronics Corp.	2-1-3 Shibasaki, Chofu-shi, Tokyo, 182 JAPAN
SCHROFF	Schroff Co., Ltd.	Yokohama Bashamichi Bldg.(8F) 4-55 Ota-cho, Naka-ku, Yokohama-shi, Kanagawa, 231 JAPAN

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SHARP	Sharp Co., Ltd.	8 Ichigayahachiman-cho, Shinjuku-ku, Tokyo, 162 JAPAN
SRT	Soritsu Electronic Instrumental Co., Ltd.	1-7-23 Nakamachi, Koganei-shi, Tokyo, 184 JAPAN
SSC	Shinagawa Shoko Co., Ltd.	5-4-19 Osaki, Shinagawa-ku, Tokyo, 141 JAPAN
SSK	San-e Seiko K.K.	Sekigami Bldg.(3F) 1-13-9 Ebisu, Shibuya-ku, Tokyo, 150 JAPAN
SSM	Susumu Ind. Co., Ltd.	8-11-11 Ikuta, Tama-ku, Kawasaki-shi, Kanagawa, 214 JAPAN
SSS	Sankyo Seiki Mfg. Co., Ltd.	1-17-2 Shinbashi, Minato-ku, Tokyo, 105 JAPAN
STA	Star Micronics Co., Ltd.	194 Naka-yoshida, Shizuoka-shi, Shizuoka, 420 JAPAN
STC	Sanwa Tsushin Kogyo Co., Ltd.	Watanabe Bldg. 1-21-11 Tsurumi-chuo, Tsurumi-ku, Yokohama-shi, Kanagawa, 230 JAPAN
STACK	Stack Electronics Co., Ltd.	3-9-18 Musashino, Akishima-shi, Tokyo, 196 JAPAN
STK	Sumitomo Special Metals Co., Ltd.	Sanyo Boeki Bldg. 2-11 Kanda-nishikicho, Chiyoda-Ku, Tokyo, 101 JAPAN
STANLEY	Stanley Electric Co., Ltd.	2-9-13 Naka-meguro, Meguro-ku, Tokyo, 153 JAPAN
SUMIDA	Sumida Electric Co., Ltd.	Kuran Iwasaki Bldg.(3F) 1-21-18 Fujimi-cho, Tachikawa-shi, Tokyo, 190 JAPAN
SUMITOMO	Sumitomo Electric Kogyo Co., Ltd.	1-3-12 Moto-akasaka, Minato-ku, Tokyo, 107 JAPAN
SUZ	Suzuki Shokan Co., Ltd.	4010-4 Aza-Miyanodai, Miyadera, Iruma-shi, Saitama, 358 JAPAN
SHOWA	Showa Electric Wire & Cable Co., Ltd.	Dai 19 Mori Bldg.(7F) 1-2-20 Toranomon, Minato-ku, Tokyo, 105 JAPAN
SWK	Showa Kosan Co., Ltd.	Daini Aoki Bldg.(5F) 2-71-6 Ikebukuro, Toshima-ku, Tokyo, 171 JAPAN
SYD	Sanyo Denki Co., Ltd.	1-15-1 Kita-otsuka, Toshima-ku, Tokyo, 170 JAPAN
SZK	Shizuki Electric Co., Ltd.	Nisshin Yaesu Bldg. (Tokyo office) 1-4-14 Kyobashi, Chuo-ku, Tokyo, 104 JAPAN
TAJIMI	Tajimi Musen Denki Co., Ltd.	2-29-1 Ebisu-minami, Shibuya-ku, Tokyo, 150 JAPAN
TAMA	Tama Electric Ltd.	2-15-12 Nakane, Meguro-ku, Tokyo, 152 JAPAN
TAS	Maruasa K.K.	4-3-9 Nihonbashi-muromachi, Chuo-ku, Tokyo, 103 JAPAN
TBC	Tokyo Byokane Co., Ltd.	3-13-6 Saiwai-cho, Tachikawa-shi, Tokyo, 190 JAPAN
TOYOCOM	Toyo Communication Equipment Co., Ltd.	Onarimon Daiichi Bldg. 3-20-4 Nishi-shinbashi, Minato-ku, Tokyo, 105 JAPAN
TOSHIBA C.	Toshiba Chemical Corp.	3-3-9 Shinbashi, Minato-ku, Tokyo, 105 JAPAN
TOKYODEN	Tokyo Denshi Corp.	1-21-13 Kami-igusa, Suginami-ku, Tokyo, 167 JAPAN
TELEDYNE	Teledyne Japan K.K.	Daiko Daisan Bldg. 2-10-7 Shibuya, Shibuya-ku, Tokyo, 150 JAPAN
TDK	TDK Electric Co., Ltd.	Hachioji Tohoseimei Bldg.(5F) 9-8 Higashi-machi, Hachioji-shi, Tokyo, 192 JAPAN
TOUDAIMUSE	Todai Electric Ltd.	3-48-6 Sendagi, Bunkyo-ku, Tokyo, 113 JAPAN
TDP	Toa Electronics Ltd.	1-29-10 Takadanobaba, Shinjuku-ku, Tokyo, 160 JAPAN
TERAOKA	Teraoka Seisakusho Co., Ltd.	1-4-22 Hiromachi, Shinagawa-ku, Tokyo, 140 JAPAN
TAMURA	Tamura Electric Works Ltd.	2-2-3 Meguro, Meguro-ku, Tokyo, 153 JAPAN
TGK	Toagosei Chemical Industry Co., Ltd.	1-14-1 Nishi-shinbashi, Minato-ku, Tokyo, 105 JAPAN
TOHO AEN	Toho Zinc Co., Ltd.	3-12-2 Nihonbashi, Chuo-ku, Tokyo, 103 JAPAN
TOKIN	TOKIN Corporation	Hazama Bldg. 2-5-8 Kita-aoyama, Minato-ku, Tokyo, 107 JAPAN
TKD	Tokyo Ko-on Denpa Co., Ltd.	723 Futako, Takatsu-ku, Kawasaki-shi, Kanagawa, 213 JAPAN
TKG	Takigen Mfg. Corp.	1-24-4 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
TKK	Takachiho Koeki Co., Ltd.	Nakamura Bldg. 1-2-8 Yotsuya, Shinjuku-ku, Tokyo, 160 JAPAN
TKW	Tokiwa Electric Wire Co., Ltd.	Shizaisoko-nai 2-14-10 Kugahara, Ota-ku, Tokyo, 145 JAPAN
TMC	Taiyo Metal Company	1-1-29 Negishi, Taito-ku, Tokyo, 110 JAPAN
TOA	Toakeiki Seisakusho Co., Ltd.	4-3-18 Minami-yukigaya, Ota-ku, Tokyo, 145 JAPAN
TOB	Tobe Kako K.K.	5-2-22 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
TOCHIGI	Tochigiya Co., Ltd.	2-11-1 Uchi-kanda, Chiyoda-ku, Tokyo, 101 JAPAN
TOKO	Toko, Inc.	2-1-17 Higashi-yukigaya, Ota-ku, Tokyo, 145 JAPAN
TOSHIBA	Toshiba Corp.	1-1-1 Shibaura, Minato-ku, Tokyo, 105 JAPAN
T. TOKUIN	Tokyo Printing Ink Mfg. Co., Ltd.	2-7-15 Tabata-shinmachi, Kita-ku, Tokyo, 114 JAPAN
TRH	Tokuriki Honten Co., Ltd.	2-9-12 Kanda-kajiyacho, Chiyoda-ku, Tokyo, 101 JAPAN
TSC	Tokyo Seiden Co., Ltd.	4-28-21 Miyamae, Suginami-ku, Tokyo, 168 JAPAN
TSK	Tokuriki Seiko K.K.	2-33-1 Kojima-cho, Chofu-shi, Tokyo, 182 JAPAN
TSS	Taiyo Stainless Spring Co., Ltd.	1-15-17 Miharadai, Nerima-ku, Tokyo, 177 JAPAN
TOTOKU	Tokyo Tokushu Densen Co., Ltd.	2-2-17 Kabuki-cho, Shinjuku-ku, Tokyo, 160 JAPAN
TAKASAGO	Takasago Tekko K.K.	1-1-1 Shingashi, Itabashi-ku, Tokyo, 175 JAPAN

MFR Abbreviation	MFR Name	Address
TEITSU	Teikoku Tsushin Kogyo Co., Ltd.	335 Kariyado, Nakahara-ku, Kawasaki-shi, Kanagawa, 211 JAPAN
TYB	Toyobo Co., Ltd.	2-2-8 Dojimahama, Kita-ku, Osaka-shi, Osaka, 530 JAPAN
TAIYO	Taiyo Yuden Co., Ltd.	6-16-20 Ueno, Taito-ku, Tokyo, 110 JAPAN
USHIO	Usio Denki	Asahi Tokai Bldg.(19F) 2-6-1 Otemachi, Chiyoda-ku, Tokyo, 100 JAPAN
UTUSYOUJI	Utusyouji	2-8-8 Nihonbashi-Honcho, Chuo-ku, Tokyo, 103 JAPAN
UUU	Sanyu Kogyo Co., Ltd.	3-9-23 Nishi-gotanda, Shinagawa-ku, Tokyo, 141 JAPAN
VDS	Victor Data Systems Co., Ltd.	608 Kashiwagaya, Ebina-shi, Kanagawa, 243 JAPAN
VIC	Victor Co. of Japan, Ltd.	4-8-14 Nihonbashi-Honcho, Chuo-ku, Tokyo, 103 JAPAN
VIOLET	Violet Electric Co., Ltd.	5-348 Tomoda-cho, Oume-shi, Tokyo, 198 JAPAN
VOLGEN	Volgen Electric Co., Ltd.	Watanabe Bldg. 4-12-5 Meguro, Meguro-ku, Tokyo, 153 JAPAN
WKC	Wada Kosan Co., Ltd.	7-35-5 Higashi-oizumi, Nerima-ku, Tokyo, 177 JAPAN
XICOR	Xicor Inc.	851 Buckeye Court, Milpitas, CA 95035 U.S.A.
YAGISHITA	Yagishita Electric Co., Ltd.	1-3-27 Kotobuki-cho, Odawara-shi, Kanagawa, 250 JAPAN
YEC	Yamato Electronics Co., Ltd.	Tojiki Bldg.(6F) 3-10-7 Iwamoto-cho, Chiyoda-ku, Tokyo, 101 JAPAN
YED	Y E Data Inc.	Sunshine 60 (9F) 3-1-1 Higashi-ikebukuro, Toshima-ku, Tokyo, 170 JAPAN
YHK	Yamani Hatsujo K.K.	2-1-8 Tenryu-cho, Okaya-shi, Nagano, 394 JAPAN
YHW	Yamatake Honeywell	2-12-19 Shibuya, Shibuya-ku, Tokyo, 150 JAPAN
YHP	Yokogawa-Hewlett-Packard Ltd.	3-29-21 Takaido-Higashi, Suginami-ku, Tokyo, 168 JAPAN
YUTAKA	Yutaka Koki Co., Ltd.	3-3-7 Mita, Minato-ku, Tokyo, 108 JAPAN
YOSHIDA	Yoshida Kogyo K.K.	4-18-11 Taito, Taito-ku, Tokyo, 110 JAPAN
YAMAICHI	Yamaichi Electric Mfg. Co., Ltd.	3-29-12 Ikegami, Ota-ku, Tokyo, 146 JAPAN
YOKOGAWA	Yokogawa Electric Corporation	2-9-32 Nakacho, Musashino-shi, Tokyo, 180 JAPAN

YOKOGAWA

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